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[OFFICIAL NOTICE.]

### Fourteenth Annual Meeting, Ohio Gas Light Association.

OHIO GAS LIGHT ASSOCIATION, OFFICE OF THE SECRETARY, COLUMBUS, OHIO, Feb. 15, 1897.

The Fourteenth Annual Meeting of the Ohio Gas Light Association will be held at Cleveland, Ohio, March 16th and 17th, 1898. The following papers will be read:

"The War of the Incandescents: Gas vs. Electric," by J. H. Maxon, Superintendent Gas Company, Gallipolis, Ohio.

"How to Avoid Competition in a Small Town," by E. G. Schmidt, Superintendent Gas and Electric Company, Sandusky, Ohio.

"Still Another Purifying Box," by Irvin Butterworth, General Manager, The Columbus Gas Company, Columbus, Ohio.

"Comparative Results with and without the Use of a Continuous Oxide Revivifier," by Moses Coombs, Superintendent Gas Company, Youngstown, Ohio.

Besides the foregoing, there will be the usual short discussions, and the members are requested to send subjects for same to the Secretary, in order that they may be inserted in the program.

The hotel headquarters will be at the Hollenden, at which place the meeting will also be held. The management of the hotel have named a rate for this meeting of from $3 to $5 per day, on the American plan, and from $1 to $3 per day, on the European plan. Street cars at the Union depot lead direct to the hotel.

Blank applications for membership can be obtained of the Secretary, who will be glad to furnish any information desired regarding the meeting. Yours truly, A. P. LATHROP, Secretary.

[OFFICIAL NOTICE.]

### Wrinkle Department, Western Gas Association.

WESTERN GAS ASSOCIATION, OFFICE OF SECRETARY, NEW ALBANY, IND., Feb. 14, 1898.

Mr. E. H. Jenkins, who was elected Editor of the "Wrinkle Department" of the Western Gas Association, desires that those who contemplate contributions to this valuable department should forward the same at their earliest convenience. This department is open to the voluntary contribution of all. Any unique, original or simple device, which is of value in saving labor or of affording better service, should be sent to Mr. Jenkins before March 20. It is hoped that members of the Association will have no hesitancy in forwarding their "Wrinkles" promptly to Mr. Jenkins. Address all communications to E. H. Jenkins, Engineer Buffalo City Gas Company, Buffalo, N. Y.

JAS. W. DUNBAR, Secretary.

## BRIEFLY TOLD.

THE CLEVELAND MEETING OF THE OHIO ASSOCIATION.—The meeting this week in Cleveland of the Ohio Association promises more than well in the instance of a noteworthy addition to its records, which records have always been in line with advance and benefit to the fraternity

and its members. President Boyle and Secretary Lathrop have seen to it that nothing has been unattended to, in the nature of preliminary or preparation, for the successful bringing off of the sessions. The Hollenden has been secured as headquarters and meeting room, and the capacity of that well managed hostelry to also serve as a comfortable lodging place is beyond question. The paper list, although not lengthy, has enough of numbers to ensure good matter for the technical work of the Association; and it is quite in order to predict that some of the matter from the Committees will provoke interesting debate.

THE McGREGOR AND DOLE PAPERS.—In this issue of the JOURNAL may be read two papers—the first by Mr. William McGregor, of Pawtucket, R. I., read before the New England Association, and having the title "The Winning Ways of Gas;" the second by Mr. S. Milo Dole, of Adrian, Mich., read before the Michigan Association, who wrote of "Our Patrons: How to Treat Them"—that are sure to carry good and valuable lessons to those who will study the text and apply its teachings. Taken in conjunction the papers really tell all that is to be told in the way of securing and holding customers for gas companies. Messrs. McGregor and Dole deserve well of their fellows, even though Mr. Dole does prescribe some special rules or methods with which it would often be difficult to calmly comply.

NOTES.—Mr. Frederick Egner, writing under date of the 9th inst., says: "In the published proceedings of the New England Association of Gas Engineers (JOURNAL, March 7, p. 366) it appears that I said, 'I interviewed Mr. Livesey and a number of other English gas engineers on the subject [inclined retorts]. I also saw Mr. Foulis * * * and they all favored inclined retorts, and were intending to put them in as fast as they got a chance.' While I probably did say all this, just as printed, I certainly did not mean to imply that—as would appear from the text—Mr. Foulis was included among those intending to use inclined retorts 'as fast as they got a chance.' I had a very pleasant chat with Mr. Foulis, on the evening of May 5 or 6, 1897, and as I kept no one in the dark as to my object in visiting England—to study the use of inclined retorts there as well as on the Continent—interviewing everybody whom I met that I thought could give me information on the subject, and hearing no adverse criticisms whatever concerning the inclines, Mr. Foulis probably knew why I was there as well as everybody else whom I met at gas works, gas offices or gas meetings. But knowing Mr. Foulis to be the inventor of the very excellent drawing machine for retort benches that bears his name, I could scarcely have included that gentleman among the enthusiastic supporters of the inclined retort system; even though, to the best of my recollection, he made no adverse remarks concerning the same. My recollections of the universally kind and cordial treatment I received at the hands of all the foreign gas engineers that I had the honor and pleasure to meet are such that I try to be very careful in quoting any of them, and would be exceedingly sorry to have unintentionally misquoted anyone."——The proprietors of the Logan Iron Works, Brooklyn, N. Y., have been awarded a contract for the construction of a gasholder at the works of the Consolidated Gas Company, foot of East 22d street, New York. The holder is to have four lifts, is to rest in a steel tank, and is rated to a capacity of 3,600,000 cubic feet. The holder plans were designed by the engineering staff of the Consolidated Company. Roughly stated the dimensions of the holder are: First lift, 168 feet 9 inches diameter, by 41 feet high; second lift, 171 feet in diameter, by 41 feet 8 inches high; third lift, 173 feet 3 inches diameter, by 40 feet 4 inches high; fourth lift, 175 feet 6 inches diameter, by 40 feet high. The roof is to have a rise of 9 feet at the center. The frame is to have 22 steel columns, each 160 feet 10¾ inches high, and in 5 sections; 110 steel girders are also arranged for. The tank is to be 178 feet 3 inches diameter at top, and 178 feet at bottom, and 42 feet deep. The bottom is to be of ⅝-inch steel, and the ring is to be in 10 courses; the bottom course to be of 1¼ inch metal; the top course to be $\frac{7}{16}$-inch. The holder is to be completed next fall.——The Self-Lighting Gas Burner Company, of New York city, has been incorporated by Messrs. Max Spier, Percy Jacobs and E. S. Ullmann, all of New York. It is capitalized in $5,000.——"H.," writing to the JOURNAL, says: "Burlington is the only city in the State of Iowa that is blessed with two gas companies, but the old Company does not seem to be seriously worried by the newcomer."——The shareholders' meeting of the Wilmington (Del.) Coal Gas Company resulted in the election of the following Directors: Edward Betts, George S. Capelle, Thomas Jackson, Samuel Bancroft, Jr., Edward Bringhurst, Jr., J. Derickson, A. D. Poole and E. T. Bellah.——The executive organization of the Nashville (Tenn.) Gas Light Company has been completed by the re-election of Mr. H. L. Sperry as Secretary, and the reappointment of Mr. J. F. Stacey as Superintendent.

[OFFICIAL REPORT.—REVISED BY THE SECRETARY.—CONCLUDED FROM PAGE 372.]

## PROCEEDINGS, TWENTY-EIGHTH ANNUAL MEETING, NEW ENGLAND ASSOCIATION OF GAS ENGINEERS.

HELD IN YOUNG'S HOTEL, BOSTON, MASS., FEB. 16 AND 17, 1898.

### SECOND DAY, FEB. 17—MORNING SESSION.

The sessions of the second day (Feb. 17) were convened at 10:30 A.M. The President announced that the contents of the

QUESTION BOX

would be discussed.

*Question No.* 1.—"A new company commences to make and sell acetylene gas compressed in cylinders, distributing the same by a wagon service, in a city in which the existing gas company has a charter for 30 years, giving it the exclusive right to make and sell gas, with the incidental privileges of opening the streets for pipes, etc. Can the old company, under the charter, stop the new? Would the new company have to secure a franchise from either the city or the State?"

The President—I believe the proposer of this question wished to bring up the legal rather than the practical point. What has Mr. Lamson to say on this question?

Mr. Lamson—In what State is it?

The President—It is not named in the question.

Mr. Lamson—It seems to me the new company would have no rights whatever within the 30 years. If the existing company has an exclusive privilege for 30 years according to the terms of its charter, then no one can interfere with it. That is a very simple proposition. If it has an *exclusive* right that seems to settle the whole question.

Mr. Shelton—I think that it is an interesting question; and I do not think it is settled by the terms of the charter, by a long shot. The company has an exclusive right to *open streets*, if I understand the question correctly.

The President—It has "The exclusive right to make and sell gas, with the incidental privilege of opening the streets for pipes."

Mr. Lamson—The new company cannot get into the city without that privilege.

Mr. Shelton—What does a city principally give when it grants to a gas company the exclusive right to make and sell gas? It gives a sole right to use the corporate property—its public highways.

The President—Would it not be a very remarkable grant to give to a gas company the exclusive right to transact business?

Mr. Shelton—It would not, if that exclusive charter could be sustained upon the line that it gave to the gas company an exclusive right to the use of the streets of the city rather than an exclusive right to sell gas. In other words, how would an old exclusive charter restrict a new company from selling gas, which asked for no franchise, for no city privileges, for no sanction from anybody, but simply sold a commodity? Why could not a company as well as a person engage in selling compressed acetylene gas, if they do not open the streets, or use pipes, or ask any privileges? How could they be stopped, any more than a man who sells shoes? It seems to me to be a grave violation of a constitutional right to say that a man cannot sell, or needs a franchise to sell, anything he pleases, so long as he does not trespass upon the police ordinances, the health laws, or other statutes in the interest of public safety. Within these limitations I think you would have a mighty hard time in driving out a company which operated without pipes, and without opening the public streets. I think it is well settled that a gas company can go into a private block, build gas works, and supply gas to 50 houses in that block without hindrance, as long as they do not cross a public street.

The President—In spite of any franchise you know of now existing?

Mr. Shelton—Yes. I think that is so in some States. Now if, by a peculiar method of manufacture, as by storing and selling the gas in tanks, they could supply the next block without the necessity of putting pipes in the public street, or by using a public street in any way except by driving a wagon upon it (as every citizen has a right to do), what is to hinder them from selling the gas in the same way to a second block, and to a third block, and so on? I think that the meat in a charter conferring the exclusive right to make and sell gas is the incidental right *to open the streets* for pipes. It is this exclusive right to open the streets for the purpose of selling that is of value and is given. I fear that any existing gas company would have a mighty hard time in attempting to stop a new company on the lines that I have outlined, for I have no hesitation in saying that I wrote this question. This

question was asked me a short time ago, and it set me thinking, and I thought it would set others to thinking.

Mr. Coffin—If you could stop them selling acetylene gas you could in like manner prevent the sale of gasoline, which is supplied in a similar manner. I think there is no question about the right to do it.

Mr. Harbison—It is a well established fact that a city does not own its streets. That has been legally decided so far as the State of Connecticut is concerned. The city of Boston as a corporation does not own the streets of Boston; nor does the city of Hartford as a corporation own the streets of Hartford. The public have an easement or right of way over them, but the title in the land belongs to the adjoining or abutting property holder. Mr. Shelton's idea is that you can, if you own a square or a block of land, go into the business of making and selling gas of your own accord, and in opposition to a company chartered by the Legislature of the State and authorized to conduct and carry on that business. To that view of the case I take very decided exception. No individual or corporation has a right to start in or interfere with the carrying on of a business which has been specially chartered by the Legislature of the State. They must obtain a charter to show they have a right to go into the business. The grant of the privilege of opening the streets is only an incidental matter, although a necessary part of carrying on the business of supplying the public with gas. I believe that if a company were to come into Boston or Hartford and attempt to manufacture, carry around and distribute acetylene gas, it would be enjoined at once. The courts would decide that they must obtain a charter from the Legislature.

Mr. Shelton—That may be the case in the State of Connecticut, and if so I congratulate Hartford for the protection which would come to a Connecticut Company—may they never need that protection at any day—but it would not apply in many other States. The question has not been passed upon by the highest court, but by some authorities opposing acetylene gas interests have been permitted despite the claimed "exclusive" right. Companies have been chartered in some of the States for the distribution of calcium carbide and acetylene gas in the manner suggested, against the protests of old companies, which protests were not sustained. The matter has not, however, been carried to the higher courts, and I presume practice differs in different States. I do not wish to be judged as endorsing this scheme, or as anticipating going into the acetylene business; but I think the question is quite important to the general weal of gas companies.

Mr. Harbison—Mr. Shelton says companies have been chartered for that business, which is just in line with my claim that they must first get charters. They cannot organize themselves without the permission of the State Legislature. That Legislature has already granted an exclusive charter to an existing company. It is quite another matter if the company first goes to the Legislature and gets a charter, for in such event, of course, they can then carry on the business.

Mr. Shelton—That was done in spite of the protest of the existing gas company. It is not so much a State charter question as a question of a city franchise being requisite.

Mr. Harbison—The old company should of course be protected in its franchise.

The President—I think there is now in operation in Boston a company furnishing electricity within a certain square—a company which probably did not apply to the Legislature for a charter, for that is not necessary in the State of Massachusetts. Anybody can organize a company for almost any purpose, up to a certain amount of capital—that is the way I understand the law; then if there be no legal objection that company can go into business in the State. And as I understand it there is no legal objection to a company organized for that purpose going into the gas, or into the electric light business, so long as it does not make use of any of the public streets.

Mr. Harbison—Without going before the Board of Gas and Electric Light Commission for permission to capitalize, to issue bonds, and all that sort of thing?

The President—My impression is even now nothing of that kind would have to come before the Commission.

Mr. Harbison—Then it is quite time for the people of Massachusetts to visit Connecticut for the purpose of obtaining information as to how to conduct their business properly.

Mr. Taber—I think that what is called the "block system" was referred to in the report of the Commissioners for last year. The organization is under the general law, and the permission to capitalize comes from the Gas Commission.

The President—Then I was in error about that.

Mr. Harbison—I thought you must have been.

Mr. Slater—The question as read seems to me to cover Mr. Shelton's point, for the question assumes that the old company has the *exclusive* right to make and to sell gas.

Mr. Lamson—The question as put takes care of itself. There are very few companies which have an exclusive right. In Massachusetts a company has a franchise to sell gas in a certain city. If a new company comes in it must apply to the Gas Commission for a charter.

The President—Am I right in supposing that in Providence the city does own the land occupied by the streets?

Mr. Slater—I think not. I think Mr. Harbison is right about that.

Mr. Harbison—There is no question about it. I am right. This matter of the ownership of the public streets is one of considerable importance to the members of this Association, and to the gas interest and industry in general.

*Question No.* 2.—"Has the erection of a holder ever been prevented by the owners of real estate adjoining the place on which it was planned to put up the holder? If so, how?"

The President—Does anybody know of any trouble having been caused a gas company by the owners of adjoining real estate, in connection with putting up a holder?

Mr. Shelton—I know of one instance which was thought to be a case of "hold up" against the company. The United Gas Improvement Company contemplated the erection of an additional holder at one of its works in a Western city, and the owner of some adjacent real estate attempted to prevent it. He employed a shrewd lawyer who alleged that the holder would be a menace to life; that as it would contain a highly inflammable and dangerous substance it was liable to explode; that it was a general nuisance; and that all the neighbors would have to move away within six months, etc., etc. He secured a temporary injunction restraining the gas company from going ahead with the work. He took advantage of a city ordinance respecting the storage of inflammable and explosive substances within the city limits, although there were already three other holders within 200 feet of the new holder we were putting up. I understood, however, that he could not maintain the temporary injunction.

Mr. Coffin—We were threatened with a similar trouble. The owner of land abutting that on which we were proposing to build a holder made objections, and we thought it was good policy to head him off. Among his claims was that the building of the holder would depreciate his property very much. In fact, he told us that he would be willing to take a somewhat less sum than was a fair price for it; through a third party we bought it at his price. When he found out that the Company had come into possession of the land he was very indignant. He said if he had known the Company wanted it it would have had to pay a great deal more for it. We bought it as a matter of policy rather than fight the case.

Mr. Egner—Some years ago the Laclede Gas Company deciding to put up a new holder at St. Louis, bought a lot and started to work on it. A real estate agent who had gotten a great deal of the adjoining property threatened to sue the Company and enjoin it from building the holder. I think he really went to law about it, but it did not amount to anything. He said the building of the holder would diminish the value of his property immensely. I was not afraid of having a gasholder near where I lived, and so I thought I might make a good speculation by buying that property. When I went to him to buy the property I took a couple of gentlemen with me. I asked him for his price, and it was away up. I told him I understood that the Gas Company was going to build a holder near by which would hurt the value of the land very much. He said, "Nothing of the kind; it is not going to hurt it at all." I then told him that as Superintendent of the Laclede Gas Company I understood he claimed the building of the holder would injure the property very much, and that I thought I might be able to get the property very cheap. Then I bowed myself out. Nothing came of the proceeding. This was in 1877 or 1878.

### Report of Committee on Obituaries.

Mr. Nettleton, Chairman of the Committee on Obituary Notices, read the following report, which was, on motion of Mr. Lamson, accepted by a rising vote, and ordered to be placed on the record.

For the first time in the history of our Association have we lost so large a number by death as during the past year. Five of our members have gone, men who were honored and respected among their associates; and we who are left, desiring to place on our records some statement of the esteem in which they were held, have caused this minute and resolution to be prepared; therefore,

*Resolved*, That in the death of George D. Cabot, Frederick W. Norton, A. H. Parker, James F. Rogers and William York, our

Association has lost valued members, who have done much to place the Association in the position it now occupies, and many of us have lost personal friends, to whom we were strongly attached.

On behalf of the Association—

CHARLES H. NETTLETON,
HENRY B. LEACH,
WALTER G. AFRICA,
C. J. R. HUMPHREYS,
H. F. COGGSHALL,
} Committee.

REPORT OF COMMITTEE ON PRESIDENT'S ADDRESS.

Mr. Nettleton, Chairman of Committee on President's Address, read the following report, which was, on motion of Mr. Sherman, adopted:

We have carefully gone over the address and find nothing to criticize and much to praise; and we congratulate the Association on its good fortune in having so able and instructive an address presented. We commend it to the careful consideration of every member of the Association.

CHARLES H. NETTLETON,
H. A. ALLYN,
A. B. SLATER,
} Committee.

The President—We will now listen to the reading of the paper prepared by Mr. William McGregor, of Pawtucket, R. I., entitled,

## THE WINNING WAYS OF GAS.

Mr. President and Gentlemen: Thrashing out straw already thoroughly thrashed is neither a commendable nor profitable undertaking. I am often tempted to laugh at the modern propensity to rhetorical display. If Max Nordau had only used the custom of essay writing, as his fundamental proof that we are "degenerates," I feel assured that he would now have more sympathizers than detractors, rather than the reverse. Does it not strike you—that is, the majority of you—as droll? One of our noble and august body—and it is the same with all Associations—gets up, and in a most serious way, and with an I am-the light-of-the-world-manner (you see how well I illustrate it, having watched and studied you all, as you "did your turn"), proceeds to prove that no longer is *his* light concealed under a bushel, but so shines that all may know that he is a bright and shining light of the New England Association of Gas Engineers.

Now I, too, am asked to enlighten or edify this magnificent body of intellectual, astute and prosperous men—your applause was expected there, gentlemen—in other words, to paint the lily or make more fragrant the rose. For, as I gaze into your faces, I realize that it is just as possible to add a cubic inch to your stature by wishing or by legislating as it is to add anything momentous or significant to the sum and total of your present knowledge regarding gas administration. After appropriating and assimilating all the vast fund of information and knowledge that we have absorbed at these and kindred assemblages of gas men, our competitors—the electricity and oil men—are justified in the attitude they assume towards each of my fellow members,

"And still they gaze and still the wonder grew,
How one small head could carry all he knew."

I am tempted to parody the dedication in Mark Twain's latest book and say: "This paper is affectionately inscribed to my gas friends, with recognition of what they are, and apprehension of what they may become, unless they conduct themselves a little more closely, upon the model of thy humble servant." If I use this liberty, will it not be tantamount to declaring that I have a message of vast import for you? That, in fact, I may grant the boon so eagerly craved by the ancient, when he sighed, "Oh! refresh me with a new idea." But heaven forbid! I have no such thing; and if you make any such deduction, great will be your disappointment and my embarrassment. No general manager can advise here, "Do as I do," for each company practically must be a law unto itself. Because I am backed up in my management by a farsighted and broad minded president, and a board of managing directors who believe in enterprise, innovation and progress all along the line, that does not imply that my friends here are all similarly blessed. And so what is possible for me to advocate and adopt may be impossible for some of you. Now with your indulgence let me say: We who assemble here are gas men; one thing interests us above all others, and that is gas. New appliances, skillful devices, original methods, ingenious improvements; have we not heard of them? Read of them? Experimented with them? By day and by night, week in and week out, our minds are constantly engrossed upon each and every means for developing our business. "Expansion and contraction" is the watchword; expansion of output and contraction of expense.

The witty and wise French philosopher said, "What one does easily, and others with difficulty, that is talent; but what one does and others cannot do at all, that is genius;" but our famous New Yorker has defined genius, "As an infinite capacity for taking pains," in other words, hard work. I think the latter definition will appeal to us the most; for in the gas business there is nothing like an "infinite capacity for taking pains." It means success. Go where you will, apply it where and how you will, it triumphs in the long run over everything. Brilliancy, versatility, precocity, all go down in the commercial lists before it. The hare in Æsop's fable was a sprinter of sprinters—*when* he sprinted; but it was the indefatigable tortoise that won the race. He was a winner because he was persistent. It is the same way precisely to-day; success in gas management is dependent, very largely, on that prime factor, "An infinite capacity for taking pains." Some may scoff at such an assertion, and wonder where enterprise, efficiency, system, skill, expertness and adroitness come in. "Come in," forsooth! Are not these, one and all, included and embraced "In that same infinite capacity for taking pains?" Why they are part and parcel of it!

Now let us see what we have confronting us! Each of us represents a manufacturing plant, backed by a capital large or small, as the case may be. I know of no bad plants hereabouts, and may say, after the style of the gentleman from Kentucky, there are good plants and there are better ones; none are bad! Now, gas has become a veritable necessity. There, therefore, you have the demand; gas manufacturing is down to a scientific basis, and there you have an assured adequate income. Local conditions vary according to location, privileges, opportunities; but as a general rule the size of the dividends and surplus is dependent on the prevailing methods of the management. And now I have arrived at the point where I may conscientiously take up my subject, "*The Winning Ways of Gas.*"

There are those who would, forsooth, persuade us that gas has had its day, and that for it there is no future. I believe most sincerely and state most emphatically the direct opposite. Gas has accomplished wonders in the past, and earned a wide and deserved popularity; but there are still greater triumphs for it in the present and in the future. Never in the history of the world has there been such a field of operations for gas men as there is to day; never were conditions more promising; never were circumstances more favorable; never were high hopes and rosy expectations more justifiably entertained. Electricity, oil, acetylene, and all the other illuminants, need give a gas man little occasion for worry, doubt or fear, provided, only, that he does his duty; he cannot rest by the way, however, and, in a self-congratulatory spirit, felicitate himself on what has been done. He must ever be doing. Conscious of the bitter rivalry of his competitors, aware of their unswerving purpose, knowing the motives that underlie their every act, he is most adequately forewarned; and surely that is to be forearmed.

Impressed by all this, he should be inspired to remain master in the field he has controlled so long. And how may he do this? Simply by catering to the wants, needs and necessities of the public. Voluntarily benefiting one's customers is after all not infrequently anticipating probable demands; and he who gives spontaneously, like he who gives speedily, twice gives. In order to stop the one great source of carping criticism the gas manufactured should be of the highest practical candle power, and as pure as possible. If the public once and for all were silenced on this point, I verily believe a gas man's life could become a happy one. And now permit me to speak of some of the ways and means we have adopted in our city to make gas a winner.

Of course, the reason for my so doing is the success achieved rather than any novel, extraordinary or original methods pursued. If I have seen a good scheme in operation in New York, in London, anywhere, in fact, I have adopted it at once. If I have read of a novel departure or a wholesome innovation I have tried it; as far as possible I have allowed other companies to make the experiments, and have profited by their experience—despite the truism of the moralist, that this is never done. I know this sounds selfish, yet it is only self-preservation. Let me tersely and simply specify how we get right into the game. Everything that comes to our net is fish; no opportunity is lost to score a point. Waste of opportunities, like that of material, is nowadays a crime. Our billheads are, therefore, utilized as an advertising medium, both face and back. Along with each bill at the first of the month goes a circular, worded in piquant and snappy phraseology, exploiting some gas appliance or apparatus. If the manufacturer whose goods are fancied is deficient in taste, lacks judgment, or is "slow," wake him up. Educate him, stimulate him by showing him, or drawing his attention to, the literary and pictorial advertisements of his competitors, and generally you will secure what you want and please him besides. We have a full line of circulars, booklets, photographs, drawings, etc., always conspicuously displayed in our offices, so that customers and "anxious inquirers" may pick out what they like and help themselves.

The generality of people get into a rut, and move along in a good-natured but prosaic routine, from which they must be aroused and inveigled by the developing of desires after new tastes and new things. Education of this kind soon results in "Off with the old loves and on with the new." Every satisfactory mechanical device that entails a use and so, consumption of gas, I am agent for. A good thing is bound to be in demand and only needs publicity. The more such appliances are brought into common use the more valuable becomes gas stock. There is no reason why gas should not be utilized in every kind of work, from running an electric light plant to heating "my lady's" curling irons; and so I have rented a store on the main street and filled it with a large variety of these appliances. The gas engine is hitched up all ready for starting instantly; the heaters are handsomely installed, with mantles and without—the store, with its brilliant illumination at night, is a sight, and by day a source of much attraction. Cooking lectures and exhibitions for the women, and engine displays for the men, are frequently given here. Competent attendants, of a smooth, tactful and resourceful nature, are always on hand to furnish facts, give estimates and, as far as they can, feel the pulse of the public. Our employees have been drilled thoroughly into a proper realization of the fact that an infinite courtesy and ready deference to the public must be extended at all times and seasons. It is an ironclad rule, and I know of few better ones. Because, as yet, you have not sold a gas engine or a "Backus Heater," or an "Instantaneous Water Heater," is no criterion that you never shall. See that your horses, carriages, teams, wagons of all kinds, give you a proper and natural advertising. On the side of our meter team we have painted, in most artistic manner, a "Welsbach light," burning in all its brilliancy, and around it the words, "Burns one-half the gas—gives three times the light." This catches the eye of the passerby, provokes an inquiry, and that is almost tantamount to securing an order.

Good-natured rivalry is encouraged among the employees in securing orders for gas stoves, "Welsbachs" and meters. Not only do they receive for these the benefit of a financial "consideration," but they develop a sympathetic interest in the welfare of the Company, and so are preferred to the "eye-servers." Another advantageous move is the arrangement made for "gas cooking parties." At a house on each of the less important residential streets we arrange with "Madame-so-and so" to set up a gas stove in her house and to provide viands sufficient in quantity and of best quality. She invites her neighboring friends "to spend the evening." Our representative directs and superintends, and when the assembled company have done justice to the product of the cooking, the "gas stove doctrine" is presented in a few well chosen words. The whole affair is regarded as a lark. Without enlarging, I may say that the scheme is working like a charm, and, unless I am overconfident, the results will be astonishing by the time the entire city is canvassed in this fashion.

We furnish (free) stoves to all the city's charitable organizations, church societies and newspaper men. The advertising of such friends is of the utmost consequence. A man is employed exclusively in going from house to house and cleaning out the burners or replacing bad or old fashioned ones. This is done because I believe that in most cases poor burners are responsible for the complaints of the quality or pressure of the gas.

If I have any inclination to be enthusiastic over any one special feature, it is the "prepayment meters"; for these do indeed fill a long-felt want. How often have we all regretted the necessity, imperative as it has been, for demanding a deposit from strangers, the indigent, the irresponsible or the unreliable? We have often felt like taking chances, yet prudence forbade. Now, however, "we light for all;" whosoever will, may burn gas by the insertion in the meter of the necessary coin. I am delighted to cater to this class of people. Heretofore they have endured the insufficient oil, with all its dangers, odors, and drawbacks. It is surely a higher education for them, and will tend to develop a demand for other improvements. We placed the first prepayment meter in January, 1897, and have at present in use 575. Ninety-six of these were to parties who formerly gave us trouble in collecting their bills; but now, to the entire satisfaction of all concerned, we are saved this expense and annoyance. I may further state that we receive $1.50 per 1,000 from prepayment meters, while from regular meters we get $1.35 and $1.40. The extra 10 and 15 cents per 1,000 goes to reducing the cost of the more expensive "P.P. meters."

Let me hurriedly run over a few of the "*Of courses.*"

*Of course.*—We keep a constant watch over every gas engine we sell. Our man regularly every month closely examines each and all of them, and keeps them in first class working order. It pays.

*Of course.*—We have several of the storekeepers canvassing for gas stoves for us. By setting up a gas stove free, in a hardware store and in a variety store, and for $1 bonus for each order, we have secured a large number of extra consumers.

*Of course.*—At various times we employ special canvassers among the different nationalities: $5 a week and a bonus is the wage generally paid. And this, likewise, has been very profitable.

*Of course.* No application for a meter to be set, or service to be looked after, is allowed to hang over. It is surely attended to the day it comes, and as soon as possible that day. Promptness is a great maker of friends.

*Of course.*—I have no need to specify more particularly, but I shall, that the class who are using the prepayment meters are composed of keepers of boarding houses, cheap lodgings, small Jew stores, "Speak easies" and club rooms, and the lower class of mill operatives. These would not use gas but for the prepayment meter plan.

*Of course.*—We make a specialty of Welsbach lights. By installing these at cost, we have attracted back to us many who had taken to using electricity. We are proving every day that, taking price, comfort and satisfaction into consideration, electricity is "not in the same class" with the Welsbach light.

Let me ask, in closing, "What have we to fear from the encroachments of the other illuminants?" We have been threatened with extinction in the past, because gas manufacture and management did not keep abreast with the general improvements in methods and systems along other lines; but invention and ingenuity and new and improved methods and systems have accomplished marvellous things for us. He possesses a faint heart, indeed, who, failing to see the "Winning Ways of Gas," dreads the onslaught of "Our friends, the enemy."

And now, gentlemen, having finished, you are conscious of the limitations of my paper. No less am I. If it were less didactic and more scientific or technical, probably you would have more enjoyed it; but I shall rest satisfied if it brings home to our minds once again, with renewed emphasis, the truth of the maxim, "Nothing succeeds like success;" and the creator of success is enthusiasm.

### *Discussion.*

The President—Mr. McGregor's very interesting paper is now open for discussion.

Mr. Goulding—How is Mr. McGregor able to sell the Welsbach at cost, when most of us here have to sell at from $1 to $1.50 profit?

Mr. McGregor—I take pleasure in answering that question. Of course I do not go to the stores where they are already using gas with any such suggestion, for it would not be businesslike. I go to the stores where gas has not been used at all, but in which oil or electricity is used. I look over the store and say I will pipe it for $3 per burner, that sum to include fixtures, piping and incandescent lamps. So long as the Welsbach Company gets its $2 per lamp it does not matter whether we make any profit or not. We are supposed to make and did make $1 on every Welsbach lamp we sold, but now we have reduced it. In that way although we sell the lamps at cost we increase our sales of gas and are getting a profit out of such sales. The arrangement gives general satisfaction.

Mr. Goulding—That would not prove a very satisfactory arrangement to our Board of Directors.

Mr. McGregor—My reply to that would be to suggest a new Board of Directors for your Company.

Mr. Goulding—But most of us do not live in Rhode Island.

Mr. McGregor—If you will make a satisfactory price we may buy out the Company.

Mr. Coffin—We followed out that line somewhat when there was a margin of profit on the Welsbach light, for we were of course bound to charge the price required by the Company; but now we have thrown that profit to the consumer in the way of piping or fixtures. When the Welsbach Company reduced the charge to $1.25 it left us so that we did not have any profit to put on the piping and fixtures; and so our business in that line was somewhat retarded.

The President—I was questioning myself where the profit came in on those Welsbach lights. One improvement I tried in my own house is in connection with the gas range. Our Company has out, on its 6,000 meters, in the neighborhood of 1,000 ranges, which were sold by us. In my own house the bill last summer was so large that it did not seem to me it could be right. It seemed as if we were using too much gas—I think there were 25,000 feet used in the three months of June, July and August. I knew of a gas range having been used approximately as much, with a very much smaller consumption of gas. This winter I had put in the kitchen, close to the gas range, a prepayment meter,

and it seems to keep the cook in quite good order so far. She is not naturally a person who wishes to throw away money, and she is not extravagant; but now she knows, when a quarter's worth of gas has been used, that she has to go to another part of the house to get another quarter to put in the slot. Every time she asks for the quarter she says to my sister (who is my housekeeper), "We have used up another 200 feet of gas, and I do not understand where it goes to." I really anticipate that next summer my gas range will be used with considerable more economy than it was last summer. I had this prepayment meter put into my own house for the sake of the experiment, for we find that gas ranges put into good houses, where the servant practically manages the kitchen, are quite expensive, in fact, are much more expensive than coal ranges. If I could keep the cost of running gas ranges down to the cost of running coal ranges in the large and handsome houses by means of the prepayment meter, or by any other means, I think a great many more of them would be put in; but, as it is, the owners of those houses do not feel justified in paying as much again for gas as fuel for the kitchen as they pay for coal.

Mr. Coffin—We had similar trouble in our house, and I tried another method. I put a governor on the gas stove pipe, setting it at the minimum pressure that would do the work of the gas stove successfully, with the result that we reduced our bill about 33 per cent. without practically reducing the efficiency of the range.

Mr. Woodward—I have adopted the somewhat similar method in my own town, and am advising my customers in many houses to use a prepayment meter, and of giving the girl $3 or more with which to run the gas stove a month. If, at the end of the month, anything is left of the money, she can keep the change, but if there is any shortage she must make it up. We have sold gas stoves in connection with prepayment meters when we could not possibly have put them in in any other way. I have been extremely interested in Mr. McGregor's paper, and I think it one of the best we have had. There are many good thoughts in it. We should push this business of selling gas for all it is worth. I think the superintendent's most important place to-day, the place where he can do the most effective service for his company, is as a seller of gas rather than in retort house management, or in the endeavor to get the cost of gas down a few pennies. If he will put more energy into the selling of gas he will be able to show larger returns for his company and incidentally cheapen the cost of gas. Without desiring to be egotistical about the matter, I will, if you will allow me, say something in regard to the way that I push the sale of gas. We sell gas on a good many different plans—that may seem strange, but it is necessary in competition. We sell in the ordinary way, where the consumer has the ordinary meter and makes a deposit. We used to collect all our bills outside. The bills were supposed to be paid by the 15th of the month. We have changed that plan. Now everyone pays at the office and gets 20 cents off per 1,000 for prompt payment. You might think it difficult to change a whole system in that way at once, but we had no trouble over it; and that is now our ordinary way of selling gas. Our second plan is by the use of prepayment meters. There are many advantages in the use of the prepayment meter. We can put them in where we could exact no deposit, and by their use we get a class of people as consumers whom it would be difficult to secure in any other way. We put them in where the credit of the people is bad or doubtful, and we do a large amount of business with just that class. We put them in for people who owed us bills for gas for years which we could not collect. We felt it was not much use to cut off our nose to spite our face, and by putting in prepayment meters we are able to get sometimes as much as $12 or $15 per month where otherwise we would get no business at all. Another thing we do is to put in Welsbach lamps, and agree to furnish gas and keep lamps in repair for a given number of hours burning for a stipulated sum. If the consumer will sign an agreement to light and extinguish each night at a certain time we will furnish his gas under contract. We have many places lighted in this way. We do it for a certain price per month, figuring on the basis of what he ought to use per year. On these contracts we have never yet lost money. The customer is pleased as it places him on exactly the same basis as the electric light user, paying a given sum per month, and there is no reason why we should not do it just as is done by the electric light people. We have many such contracts, by means of which we secured or kept customers whom we could not have obtained in any other way. They are really willing to pay more for gas than they had been paying ordinarily, because they could have gas for so much per month and knew beforehand just what they would have to pay. We took to pushing gas stoves last year in a little different way from that adopted by most companies, and have been fairly successful. My Manager told me I had to put out 125 gas stoves in 1897—before that we had never put out more than 25 or 30 in a season; but last year we managed to put out 150 gas ranges. We sold them so that we got back the cost of the stoves. People know we are selling stoves at a right price, and now they come to us to buy instead of going anywhere else. A great many new houses are being built in our place all the time; and where we connect stoves free and services free, provided only that they buy a stove, we can practically get new stoves in every house that goes up. The owner may not appreciate the stove immediately, but he will appreciate it in the near future. We are looking to this future, and are then expecting a large increase of gas consumption. The stove becomes a fixture. It is a part of every new house. Stoves sent up our output 72 per cent. one week last summer, which was a pretty good gain. We feel a little put out with the Welsbach Company, for the reason that the business is fast passing out of our hands; we are so near New York that we are flooded with other burners. Burners coming from the outside we do not control, but I think the gas company should always keep control of all the appliances that are used, and especially of all burners. We have had fair success with the sale of gas engines. Just before I came away we put a gas engine into a livery stable to furnish power to a horse cleaning device. It is claimed that by the use of it horses can be cleaned better and quicker than by hand. I cannot add very much to what Mr. McGregor said, except to emphasize that a gas company ought to get in a popular way with the people, and so be able to accomplish much more than by pursuing a seemingly antagonistic policy. It pays to stand well with the plumbers, the police, the village authorities and the janitors. You can "catch more flies with molasses than with vinegar." We try in all ways to cultivate a kindly feeling, and to overcome the antagonism to gas companies which people used to have. We buy supplies in the town whenever we can, instead of going outside for them. That always makes a better feeling in the town. Another thing about the sale of gas stoves might be mentioned. Those of your employees in that line should be courteous and so strive to cultivate a good feeling towards the company; but they can do more than this. My idea is that every employee ought to be a hustler for gas stoves and the sale of appliances all the year round, day and night; and I believe in making it profitable to them to be such. Last year I sold more gas stoves out of the office, through the exertions of employees, than I sold in the office. Give them a little bonus on all gas stoves they sell. In this way you may have your service men and laborers all working in your interest in the sale of gas stoves. Through their efforts you sell many stoves which you could not sell by any other means. Our village authorities have just closed a contract with the Welsbach Street Lighting Company to light all our principal streets with the new improved Welsbach street light. The competition for a contract was very sharp, there being two electric light companies in the field. The Welsbach won entirely on its merits, and Welsbach gas lamps are on every street where we have gas mains. The electric company has to satisfy itself with taking the outskirts and streets where we have no gas mains.

The President—How many prepayment meters has Mr. Woodward in use?

Mr. Woodward—We put out nearly 100 prepayment meters last year; we have 1,000 meters altogether.

The President—What price do you get for Welsbach street lighting?

Mr. Woodward.—Our village pays $33 for each post per year. I might say further that we have an average of 10,000 cubic feet per year through each prepayment meter. Although that is not so much as the average from many of the ordinary meters, it nevertheless brings in quite a good revenue. We put all those in within a year.

The President—Does any other gentleman desire to say anything concerning this paper, or as to the best way of placing gas stoves or burners?

Mr. Roper—If the Association will permit me (as I am not a member) I would like to refer to what has seemed to me to be a general misunderstanding, not only in this Association but with a majority of gas men. I have just gone through a lot of tests, and by accident I discovered what I did not know before, and what I think is unknown to a great many. It is an error to suppose that a gas stove is more expensive when gas is used under a heavy pressure. Take a burner, and with it heat 10 pounds of water (which is the way I generally make the test). Have a test meter which measures a tenth of a foot of gas and a stop watch which will register one-fifth of a second. Bring the water from a given point to 212°, and there are very few men in this room who can figure out the fraction of the tenth of a foot of gas that it would take to bring that water to that temperature, as between 1-inch pressure, 1½-inch pressure, 2-inch pressure, 2½-inch pressure, 3-inch pressure, 3½-inch pressure, and 4-inch pressure. From 1-inch pressure to 4-inch pressure you bring that water up to that temperature with al-

most exactly the same number of feet of gas, the difference being simply in the time taken to do the work.

Mr. Coffin—I suppose that is aimed at me.

Mr. Roper—I make the remark because of the general belief which seems to exist among gas consumers that an increase of presssure means a corresponding increase in the gas bill. I know that gas men have that complaint made to them every day; but the tests which I have made show the fallacy of that claim.

Mr. Coffin—Theoretically I agree with Mr. Roper in his statement, but practically I am just as opposite as possible. We all know that when water in a vessel on a gas stove has been brought to the boiling point the flame of the burner can be reduced two-thirds and still main tain the water at that temperature. All used beyond that is waste. With less pressure you are longer in reaching the boiling point, and I do not see that there will be any difference in the amount of gas consumed in reaching it. In regular kitchen use, or as most of our stoves are used, if you were to leave a 4-inch pressure on you would not have nearly so many stoves in use, at the price for gas we are charging in New England.

Mr. Roper—The gentleman does not understand me. I did not mean to say you could not waste gas. I refer to the bringing of water to the boiling point; not to keeping it there. I have made the tests practically. I am speaking about taking it from any given point up to the boiling point, stopping when you get there and turning the gas out. You may waste all the gas you wish to in carrying it further. The fact is, two-thirds of the gas as ordinarily used in gas stoves is wasted; that is, it is not really needed for doing the cooking.

Mr. Coffin—I agree with the gentleman in that statement. There is a waste of from one-third to one-half. With a governor intervening between the meter and the stove you can take care of one-third of that waste. I think ordinarily our domestics, not having much interest in the gas bills, do not care how much gas they use. We have 300 or 400 gas ranges in use; but if they were not carefully watched the price of gas would make such use prohibitory. The question was brought to my attention in connection with the use of gas stoves for heating tailors' geese. A tailor who desired to put one in his shop said if he could run it for what coal had cost him, or even at a little higher cost (as it gives less heat in the shop), he would use it. He made the trial, and found the gas cost him at the rate of $18 per month. We then put on a governor and reduced the cost to $10. The governor passed just enough gas to furnish heat to the geese, and prior to its use the blaze came out all around, and a large part of the gas was wasted. By that experiment we reduced his bill nearly 50 per cent. If we had not done that immediately that trial would have decided him not to use gas. He has now used it for five years, and his stove has enabled us to sell two or three others for tailor shops.

Mr. Roper—The same saving could have been made if the man had turned his valve down.

Mr. Coffin—But he would not do it.

Mr. Roper—You can educate people up to doing that. That same tailor may some day want the iron made hot more quickly, and with the governor on he cannot do it. By turning on a full flame of gas he could heat the iron quickly, and then turn the gas down.

Mr. Coffin—We discovered that need, and sent him a stove clear of the governor, so that if his head pressman wanted to heat an iron more quickly he could use that stove.

Mr. Roper—That only backs up my statement. I did not mean to contradict anyone nor to get into an argument, my purpose having been to give some information which I accidentally found out. When a consumer complains that you have forced his gas bill up by increasing the pressure you can assure him that you have not done it, and that the increase has been due to his own carelessness. I have made some tests to ascertain the relative cost of cooking with gas and with coal, and from these results you can each figure out results for yourself at your own price for gas. The following tables show the loss in weight and time occupied in cooking the several articles named; first, by the use of a coal stove, and then by the use of a gas stove:

*Coal Stove..*

| Article and How Cooked. | Weight Before Cooking. | Weight After Cooking. | Loss. | Time. |
|---|---|---|---|---|
| Bread, baked.... | 2½ lbs. | 2 lbs. 6½ ozs. | 1½ ozs. | 35 min. |
| Beef, roasted.... | 3 lbs. 7 ozs. | 2 lbs. 4½ ozs. | 8½ ozs. | 1 h. 15m. |
| Steak, fried..... | 1 lb. 4½ ozs. | 1 lb. 3 ozs. | 1½ ozs. | 8 min. |
| Chops, fried. ... | 12 ozs. | 10 ozs. | 2 ozs. | 11 min. |
| Chicken, broiled | 22 ozs. | 15 ozs. | 7 ozs. | 45 min. |
| Fish..... | 10 ozs. | 7½ ozs. | 2½ ozs. | 17 min. |

30 lbs. coal, at 8 cents + kindling, 1 cent = 9 cents.

*Gas Stove.*

| Article and How Cooked. | Weight Before Cooking. | Weight After Cooking. | Loss. | Time. |
|---|---|---|---|---|
| Bread, baked.... | 2 lbs. 7 ozs. | 2 lbs. 5½ ozs. | 1½ ozs. | 35 min. |
| Beef, roasted.... | 4 lbs. 1 oz. | 3 lbs. 9 ozs. | 8 ozs. | 1 hour. |
| Steak, fried..... | 21 ozs. | 19 ozs. | 2 ozs. | 8 min. |
| Chops, fried..... | 18½ ozs. | 12 ozs. | 1½ ozs. | 9 min. |
| Chicken, broiled | 16½ ozs. | 12½ ozs. | 4 ozs. | 14 min. |
| Fish..... | 16 ozs. | 13 ozs. | 3 ozs. | 14 min. |

Cost of gas, 6 cents; quantity consumed, 40 cubic feet; rate, $1.50 per 1,000.

Another thing I would like to mention is with regard to water heaters. You will have more trouble with your water heaters than with all the rest of your appliances put together. I have recently discovered that, in heating water with gas, it is possible to heat 20 or 30 gallons in a tank and still draw cold water right straight through the heater; the pressure will carry the cold water right straight through, so that in the house you will be drawing cold water instead of hot. That has occurred in a number of cases to my knowledge. Only a short time ago I was appealed to to examine a heater which the owner said did not give satisfaction, because he could not get hot water when he wanted it. We found that was the trouble. In making tests I have connected up a boiler, making the cold water connection at the bottom, where you are in the habit of having the drain cock. If you will run your water up into the tank from the bottom, and then connect your pipe to the heater, connect with a "T" at the top, and run the nipple into the boiler five or six inches, putting a plug or bib cock in the other end of the "T," and then take the cold water pipe out of the boiler (that is, the original cold water pipe), and use the original cold water outlet as a hot water outlet, you will overcome that difficulty. It is true you will have to heat that 5 or 6 inches at the top of the boiler before you can draw any hot water; but you must draw hot water then. You cannot possibly draw any cold water as long as there is any hot water left in your boiler. We found that with the pipe leading out of the top it would become air bound. That is the reason we made the connection with a "T." After it becomes air bound you can remove the little plug at the top and let the air out, and then you will have no trouble afterwards. You will also find that you will be able to heat a great deal more water, and will avoid a great deal of trouble and annoyance.

On motion of Mr. Coffin a vote of thanks was tendered to Mr. McGregor for his paper.

### Votes of Thanks.

On motion of Mr. Lamson a vote of thanks was tendered to the President for his efforts to secure a successful meeting, and for the able manner in which he conducted the proceedings. A vote of thanks was also passed to the Secretary for his care in preparing for the meeting, and for the manner in which he performed all the duties of his office.

The meeting was then declared adjourned.

[Concluded from page 375.]

## ABSTRACT OF PROCEEDINGS, FIFTH ANNUAL MEETING, MICHIGAN GAS ASSOCIATION.

Held at Hotel Harrington, Port Huron, Mich., Feb. 16 and 17, 1898.

### First Day—Afternoon Session.

The Association met pursuant to adjournment. The first business was the consideration of the proposed amendments to the Constitution, as submitted by the Executive Committee. The discussion and ballot resulted in the adoption of the amendments as submitted by the Committee.

The President named Messrs. L. E. Walker, E. F. Gallagher and W. J. Bostwick a Committee to select the next place for meeting.

Mr. Edward J. Elles, of Detroit, Mich., then read the following paper on

### THE UTILIZATION OF COAL TAR BY DISTILLATION.

Mr. President and Gentlemen of the Michigan Gas Association: In presenting for your consideration the results of some study on this subject, it is my sole aim to explain my views in as practical and explicit a manner as possible.

No apparent notice seems to have been taken of the appearance of tar during the heating of coal, so-to-speak, prior to the latter part of the

Seventeenth Century, at which time a German chemist, Johann Joachin Becher, made some trifling determinations, and is credited with being one of the first, if not the real originator of the coal tar industry.

Since the time of their discovery, coal tar and its derivatives have gradually mastered their way to the front, and are now considered among the foremost commodities of the commercial world.

The Detroit Gas Company has just completed the construction of a pitch plant, under the supervision of its engineer, Mr. Isaac C. Baxter, and the data herein contained pertaining to the production of pitch, light and heavy oils and ammoniacal liquor are the actual results ob tained from said plant.

The securing of a suitable location for the plant caused considerable agitation, for if it had been placed in close proximity to the buildings used in the manufacture of gas there would have been quite a material increase in the Company's fire insurance rates. It was finally deemed advisable to build it on the dock near the river's edge, and at least 200 feet from the nearest neighboring building. The start was made by excavating for foundations, which had to be of a very substantial nature to support the brick smokestack, still setting and still proper, which is of a 120 barrel or 6,000 gallons capacity.

*Description of Still.*—The still, which is made of half-inch firebox steel, is 16 feet long and 8 feet in diameter, with convex heads and mounted in a horizontal position, with a dome on the top from which the outlet pipe leads to the condenser. An 18-inch manhole, securely covered with a plate, which is removed after each distillation, is also provided, allowing the operator access to the interior in order that he may examine it closely and remove any coke that may have formed during the distillation. The bottom of the still is entirely arched from the front end to the bridge wall, from which a series of flues convey the waste gases to the smokestack. The flame never comes in direct contact with the still proper, and is only, as it were, in a hot air bath. The stills last much longer by this method than the so-called naked ones which come in direct contact with the fierce flames.

A 1-inch iron stopcock is placed on the upper or top side, and is opened quite frequently during the earlier part of a distillation. An iron rod, graduated in inches, is run through this cock for the purpose of ascertaining the height of the liquid, which boils and foams furiously between the temperatures of 140° and 220° F. A 2-inch iron safety valve is also provided on top of the still near the rear end, which gives warning to the operator during the crisis of a run or distillation, and prepares him for any emergency that may present itself. There is a 14-inch manhole securely covered in the front end or head, which is opened after the pitch has been run off into the cooling tank. The still is allowed to cool for at least 5 hours, which is very essential; for if the cover is removed any sooner, the cold air entering, especially during the winter season, would have a tendency to warp it. This manhole is also used when cleaning the interior of the still. The 4-inch connection for discharging the pitch into the cooling tank is taken from the bottom of the rear end of the still and should be a direct line, for elbows or tees would act as pockets, allowing the pitch to congeal. This would necessitate heating the pipe again to insure a constant flow for the following distillation.

A 1-inch connection, with a cast iron cock attached, is also taken from the rear end and about 6 inches from the 4-inch discharge. This is used when sampling the product for determining its quality.

The practical way of testing pitch is by kneading a small piece between the teeth. If it is easily accomplished the pitch is soft and should be of a shiny black appearance; if with more difficulty, it is medium or moderately hard; and if crushed to a powder it is hard, the color verging upon a lusterless gray.

*The Cooling Tank or Pitch Receiver.*—The cooling tank is made of ordinary ¼-inch boiler iron with ⅜-inch heads, single riveted, with the seams caulked on both sides, and is 25 feet long and 6 feet in diameter.

This tank is placed on three substantial brick piers in a horizontal position, just back of the still, where it receives the pitch after it is produced. There are three 2-inch connections taken from the bottom of this tank for barreling purposes. The pitch should remain in the cooling tank at least 12 hours before barreling, for if drawn off at a high temperature it will foam and prevent the entire filling of a barrel.

The local demand for pitch in Detroit calls for single-headed barrels, but when transported by rail or water it is generally required to have sound barrels with two heads.

A pyrometer capable of registering 900° F., and attached to a stem 4 feet 6 inches long, which is placed in a 1¼ inch pipe, capped at the bottom and entering the still in a perpendicular direction, is used. The indicator is similar to that of a steam gauge dial, and about 6 inches in diameter.

*The Storage Tanks.*—Next in line are the tanks for the storage of the ammoniacal liquor and the light and heavy oils. These are oval in shape and 12 feet in height, containing 50 gallons per inch, and are placed side by side, as shown in the accompanying illustration. They are old tanks and were purchased from a large rolling mill in the vicinity of Detroit, having previously been used for the storage of crude oil. The tanks are placed in a pit extending about 3 feet below the ground line about the still, in order that their entire capacities could be utilized for the storage of oils leaving the condenser, which is located on the top of the heavy oil tank.

The 6-inch outlet pipe taken from the dome on top of the still is gradually telescoped until it reaches the condenser coil, where it is but 4 inches in diameter, and is there again reduced to the diameter of the pipe constituting the coil, which is 3 inches, and made of extra heavy galvanized wrought iron pipe. The entire length of the coil, which is 4 feet 6 inches in diameter, is 60 feet, with a valve on the inlet, which is closed in case of a stoppage so that a pressure of steam can be turned into it for the removal of any obstructions.

The cylindrical condensing tank is 6 feet in diameter and 9 feet in height, and is supported by a piece of 4-inch I-beam placed crosswise on the top of the heavy oil tank. It is made of ¼-inch tank iron and single riveted, having been used for a water supply tank when in the possession of the rolling mill company.

The water in the condensing tank should not be allowed to get warm until very near the time for changing the oils, but should be warmed if not already so by the time the change occurs; for the naphthaline would crystallize and choke up the worm, thus producing a dangerous pressure on the still. Most of the explosions of tar stills, where a safety valve or an equivalent contrivance is not provided, are probably always caused by neglect in this particular respect.

There is a 1-inch water supply pipe leading to the top of the condenser, with a cast iron cock near its discharge and a 1¼-inch outlet pipe at the bottom to drain the tank of any sediment that may accumulate.

A 1-inch steam pipe is also run to the top of the condensing tank and dips into the water surrounding the coil or worm. This is used when the still is not in operation to prevent the water from freezing. A 3-inch galvanized, sheet iron pipe is used when the change of oils takes place; for, as I have stated before, the outlet or discharge of the condensing coil is directly above the heavy oil tank and before the oils change from light to heavy. This pipe is used for conveying the first named oil into its receiving tank.

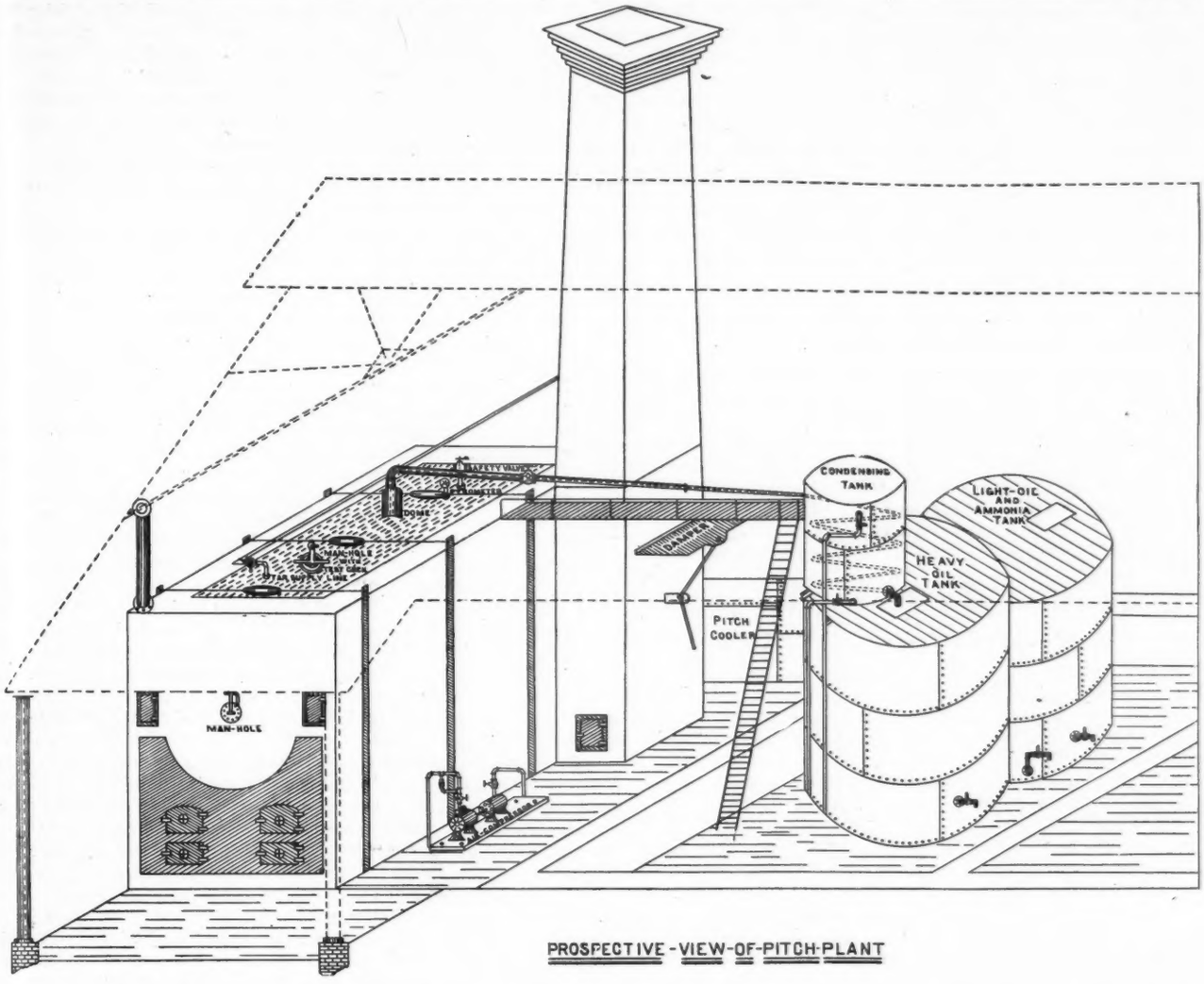
*The Steaming Tank.*—The steaming tank, in which the tar is heated to a temperature of 212° F. before entering the still, is located on the top of a substantial wooden trestle, and is 25 feet from the rear end of the still. A 4-inch pipe line is taken from the bottom of the steaming tank and leads to the top of the still, which is 5 feet lower, allowing the tar to flow quite freely by gravitation. A 4-inch iron cock near the still is inserted in this line, which is closed after the still has been filled to its proper height. The entire bottom of this tank is covered by a steam heater constructed of 1-inch, extra heavy, wrought iron pipe, which is 10 inches from the bottom, and supported by small wrought iron chairs made for the purpose. A single action air compressor with a 12-inch stroke is used for mixing the coal tar in the steaming tank, by forcing a volume of air through the entire quantity of tar before it is steamed, which insures better and more rapid separation of the water from the tar.

The compressor could also be used for forcing air into the pitch cooler, thereby cooling the pitch more readily than by natural exposure.

I have now completed a brief description of the plant, and will proceed by giving the actual results obtained and the manner in which a run or distillation is conducted.

The coal tar in its crude state is pumped from the tar wells into a large receiving tank on the dock, where it remains until wanted for use. Everything being in readiness at the plant, a charge of about 100 barrels of coal tar is pumped into the steaming tank, where it is thoroughly steamed until a temperature of 212° F., or very near, is attained; any water that may come to the top, which is always the case, is run off through a 2-inch connection provided for the purpose. The tar after being thoroughly steamed remains in the tank from 8 to 12 hours.

The cock on the 4-inch line leading from the steaming tank to the still is next opened, and a charge of 88 barrels (4,400 gallons) is run into the still; the cock is then closed and all connections, including the condensing coil, are closely examined and manholes securely fastened. A slow fire is then started under the still and the pyrometer closely




PROSPECTIVE-VIEW-OF-PITCH-PLANT

observed until a temperature of 220° F. is attained. The danger of foaming or a "puke" (which is the more common expression used) being then a thing of the past, the fire can now be increased until a temperature of 525° F. is reached, which completes the run of an average pitch for roofing purposes.

The ammoniacal liquor and light oils come off at from 165° to 446° F. At first a great deal of water with very little oil runs; then less water and more oil. This is about the time the so-called break takes place, which is probably due to the fact that the ascending vapors carry along a quantity of oils of much higher boiling point which nestle to the sides of the still for a time, and then drop down into the liquid again.

The heavy oils come off at from 446° to 525° F., but a test is always taken, when the temperature for changing oils is attained, by catching some of the distillate in a glass cylinder in which the light and heavy oils separate at once, the former going to the top and the latter to the bottom.

*Light Oils.*—The light oils, through repeated rectifications and further chemical treatment, are utilized in a great many different ways too numerous to mention, and in which I have had no practical experience, further than to state that the oils in themselves are largely employed in the manufacture of black varnish, the formula generally adhered to being as follows: To 40 barrels of soft pitch, heated to a liquid in an upright cylinder with a convex bottom, add 6 barrels of light oil and 6 barrels of naphtha, keeping the mixture as hot as is consistent with the volatility of the naphtha; then mix the three ingredients thoroughly, by applying a pressure of air taken from the compressor, after which add 100 pounds of rosin and 5 pounds of petroleum wax heated to a liquid.

A practical test of the varnish is made by submerging a small piece of sheet tin in it. If the varnish runs off freely and only leaves a thin coating it has shown itself to be of the proper consistency for easy application with a brush, and is barreled for the trade. The varnish will adhere firmly to iron, and, after drying from three to five hours, exhibits a considerable degree of hardness together with glossy luster and smoothness.

I may also state that the light oil produces the benzole of commerce, and that it is not only used in making aniline dyes, but is also required in photographic chemicals. If not sold as benzole it is converted into oil of nitrobenzole, which is used by whiskey distillers to give the smoky flavor to their product, while lager beer brewers use it to age their beer, notwithstanding the fact that it is a deadly poison. Another, and one of the more important derivatives of the light oils which deserves mention for its usefulness in medicine, surgery and the mechanical arts, is what is commonly known as carbolic acid, the demand for which is rapidly increasing, especially in our own country.

The ammoniacal liquor taken from the bottom of the light oil tank, through a tap or connection provided for the purpose, is barreled and taken to the ammonia wells, and from there passes on through the general routine with the balance of the liquor from the works. The average strength of the crude liquor taken by means of the hydrometer equalled 1° on the Twaddle scale, at a temperature of 60° F.

*Heavy or Creosote Oil.*—The creosote oil is chiefly used as a preserver of wood. It not only preserves the wood from decay, but from the attack of the marine worm in salt water.

The process of creosoting the piles in docks and bridges has been in general use in England for the past 60 years. It has also come into general use in the Southern States of our country for the creosoting of railroad ties, and of timber used in railroad bridge construction.

Printers' ink is produced by grinding the soot which accumulates in a closed apartment of a creosote oil furnace with linseed oil, and whenever you look at a book or newspaper you see a derivative of coal tar on it.

*Pitch.*—It is used for many purposes; in making gravel roofs, in the

brick and wooden pavements in the streets of our cities, and in the manufacture of target pigeons, etc., for rifle practice. It is also used for lining powder kegs and in the construction of vaults. No moisture can penetrate it.

The results obtained at the plant in Detroit from a distillation of 88 barrels (4,400 gallons) of coal tar weighing 22 tons (2,000 pounds to the ton) are as follows: Seventy barrels or 18 tons, 1,166 pounds of pitch: 8½ barrels, or 1 ton 1,570 pounds heavy oil; 3½ barrels, 1,418 pounds light oil; 2 barrels, or 820 pounds ammoniacal liquor.

There were 2,500 pounds of bituminous run of mine coal consumed under the still, and 17 hours was the required time for the distillation, from the time the fire was started until it was extinguished.

Samples of the pitch, which is moderately hard and made for roofing purposes, together with samples of the heavy and light oils and ammoniacal liquor, will be on exhibition, and can be more closely examined by the attending members of the Association.

The discussion that ensued was both entertaining and instructive, Mr. Elles in his replies showing that his knowledge of the Detroit Company's coal tar distilling plant was exhaustive. At the close of the discussion a resolution to appoint a committee to investigate the matter of coal tar distillation, with a view to determining whether it would be profitable or advantageous for the other Companies of the State to engage in, was adopted. The President appointed as such committee Messrs. John J. Knight, H. D. Walbridge and W. M. Eaton. The committee was instructed to hand in its report as soon as possible. A vote of thanks was passed to Mr. Elles.

Mr. S. Milo Dole, of Adrian, next read his paper entitled

## OUR PATRONS: HOW TO TREAT THEM.

I am not a drinking man, neither do I smoke; therefore you will readily perceive that my subject does not relate to those certain habits and customs peculiar to and familiar in the bar room or at the cigar stand, but is rather a plain business proposition, having reference only to that business-social relation which we sustain to our patrons, and in the exemplification of which may be traced and found the cause of much of our success or failure. Let us, therefore, lay aside for the present all thoughts of improved furnaces, unerring governors, infallible meters, and non-leaking mains, and also all fear of "blowing" boxes, "filled" stand pipes, or "frosted" services, and settle back in our chairs, in the most comfortable position at our command, to consider for a little while, "Our Patrons: How to treat them."

Our patrons; who are they? Their name is "Public" and they come from everywhere! From the palace of the rich man, where crystal or gold-plated chandeliers, bearing dainty globes curiously and beautifully etched, assist the gaslight in shedding mellow glory over luxurious furnishings, to the cottage of the laborer, where brass pendants and gilded brackets, supporting sand blast or opal globes, permit the gas flame to shed its same mellow glory over less pretentious apartments.

And their disposition; it is as varied as the springtime weather! Sometimes the dyspeptic with his pessimistic views of things and people; sometimes the doubter with his disputations of facts and figures; and sometimes, thank Providence, the good-natured, satisfied consumer, who cheerfully pays his bill and contentedly walks away.

And their needs; why, they are as the planets for multitude; their wants—as the sands upon the seashore; their demands—as the stars of the milky way for number, and frequently as difficult to perform as to scale the height from earth to heaven while cumbered with these bodily tenements of clay.

And who are we that deal with this Public, come in contact with its varying disposition, try to supply its needs, attend its wants, and meet its multiform demands? Why, we are an association of men, selected from among the various walks of life, subject to the same ailments of mind and body as other men, possessing temperaments of differing kinds and qualities, limited and circumscribed in our powers of accomplishment by well-nigh inflexible decrees of nature and of custom. And yet, behold, how many and how great our opportunities! The question is, are we enough *bigger* than ourselves to *make* ourselves do the things our judgment says we ought to do? But this question is not for me to answer; my duty being merely to suggest *what* I believe we ought to do, while each one of us as an individual determines whether or not we do now or will hereafter measure up to the standard indicated.

The problem, then, is "*How shall we treat our patrons?*" And in its discussion I shall endeavor to proceed in what appears to me the logical order, dropping a hint now and then that I trust may prove helpful to some one, but leaving the fine sifting for you of more years and larger experience.

*First.—The Place of Contact.*—This is generally the office, and is deserving of more than passing notice. Remembering that our business is the making and selling of light (or that which produces light) it does not require much effort of analogy to perceive that our *place of doing business* should be of the modern, progressive type. It will not suffice to have a little, dingy, ill-ventilated, poorly lighted room; neither is it necessary to have an exceedingly large and extravagantly furnished building. That which *is necessary* is a comfortably sized office, decently furnished, scrupulously cleansed, and perfectly lighted, if we would successfully impress our patrons with the dignity and high character of our business.

I once called at the office of a certain gas company, and this is what I saw: A room about eight by twelve, with seven foot ceiling, two broken chairs and one crippled stool, a badly scarred desk littered with papers of every description and covered with dust, sidewalls and ceiling absolutely filthy, floor filthier still, two windows that looked as though they had never been cleaned, three common old-style brackets—one over the desk supporting a dirty argand burner, one in the rear with a "batswing" burner, the other near the front with a Welsbach having a broken mantle and chimney. The proprietor was sitting in one of the broken chairs, his feet resting on the crippled stool, smoking an old briar pipe strong enough to raise the dead. When I entered he said "How-'d-do," but never offered to get up. I handed him my card, when, observing that I was connected with a gas company, he managed to take his feet off the stool and invite me to the vacant chair. Then he began to ask questions: "How is business?" When I replied "good," he was much surprised; said his was very poor. Then he wanted to know how I liked the Welsbach, and when I told him it was a good thing, said it had done him "more d——d harm than anything he'd ever tried." Thus ran the conversation, until at last I excused myself, to get a breath of fresh air and gain control of my enraged feelings over such a desecration of opportunities.

Pretty place for a lady to go to pay a gas bill! Nice sort of an office to represent one of the best kinds of business in the world! And yet that was in Michigan, in a thriving little inland city. The concern has since changed hands, and I am glad to report a corresponding change in appearance and an increase in business.

Another important part of office equipment is the clerk, or book-keeper, or whatever you are pleased to call him, who, in the absence of the usual manager, must attend to the public wants. This personage means a great deal to the small companies, where one or two individuals attend to all the business. And I want to state it as my solemn belief that a cheap boy or man for such a position is an *expensive* employe to have around; whereas a good man, at fair salary, will more than *save* and *earn* the difference in amount of pay.

Much more suggests itself as to the office and its relation to the question at hand, but enough has been said, I trust, to illustrate the thought in mind, and time forbids we should longer tarry over this portion of our subject. We will therefore consider

*Second.—The Contact.*—Whether this occurs in the office (as is usually the case), or on the street, or elsewhere, the general facts concerning it, and the general rules which should govern it, remain much the same. We must ever be on our guard—never permitting ourselves to be taken by surprise—and getting such complete *mastery* of ourselves as to seem always natural and approachable. We must also give evidence of personal interest in the successful working of our business, and in the welfare of our patrons. So that whether a given trouble be our fault or not, whether a certain complaint be of real or imaginary origin, whether a particular demand be reasonable or wholly unjust, in each instance and in all instances we approach the matter in such a spirit of frankness and open candor as to at once dispel any suspicion which may exist in the minds of the parties concerned that we are disinclined to meet the question in a fair and impartial way. And, above all, we should never (no matter how great the provocation) lose control of our tongue and temper! Does this mean a struggle for some of us?—perhaps it does for you, I know it does for me—but in its sure attainment lies more than half the victory in the solution of problems and difficulties which otherwise might prove our humiliation or defeat.

To illustrate: It may be a cloudy day, and with the perversity often attributed to things animate and inanimate, your fireman has allowed the "heats" to "get down," with the result that your holder is steadily lowering instead of rising, and the outlook for the night's supply is all but encouraging. Of course you have reproved the fireman, but as he is the only one immediately available you have smothered your wrath somewhat in fear of being left entirely "in the lurch." While in this perturbed state of mind you seek the office, there soon to meet one of your customers who has entered to register a gentlemanly complaint. With that marvelous perception so common among gas men you discern at once that the trouble is more fanciful than real, and as much the customer's fault as yours, and, feeling quite impatient with things in general, you forget yourself and reply with speech that is exceedingly caustic, and in manner indicative of your great displeasure. Of course you did not intend to be unkind nor impolitic, but you were thinking, "confound that fireman," and worrying about the danger

of a "grounded" holder, and failed to exercise that self-control which should ever be your peculiar virtue.

And the customer! Well, he went away much grieved in spirit, concluding that you were an extremely unreasonable man, and recalling the hard things he had heard said about the gas business, and eventually joining that circle of your enemies whose poisoned tongues cast odium on our fraternity. And this, too, in face of the fact that the customer referred to had always before been kindly disposed to you, and had he been properly handled on this occasion would likely have departed your firm, appreciative, business friend.

To illustrate again: Conditions similar to those before mentioned, save that the customer instead of being gentlemanly is quite abusive, twits you upon the dishonesty of "gas men" in general, and the business in particular; makes foolish assertions about the "presentation of bills when the gas had not been lighted;" assumes the air and attitude of one whose right divine is to pass judgment upon other men's integrity; and, in short, completes the scene by making an "ass" of himself in general, Of course your pulse beats faster, the crimson blood may even mount your cheek, but still you hold your peace while skillfully you parry off each savage thrust; the outcome being that soon you have your "kicker" vanquished and ready to capitulate upon terms of reason and of business honor. And the final result! Why, he leaves your office, inwardly calling himself the fool he has been, and feeling that you are not only a gentleman, but a first-class business man worthy of every confidence. And when he hears others making unfeeling insinuations as to your worth and fairness, you will (not always, perhaps, but generally) have a friend to take your part and maintain that at least there must be some mistake, and that if given an opportunity you will surely do that which is just and right.

And certainly no one would claim but that this latter is the better way!

I fully understand, in fact no one realizes more keenly than myself, how difficult a thing it is to suffer vilification at the hands of an unreasoning person and not return like for like. But I know it can be done, and that in the doing of it is a delightful consciousness of mastery over self and victory over one's antagonist.

Nor should it ever be supposed that such action is evidence of weakness on our part—not at all! Rather is it unmistakable evidence of our force and strength—something to be sought after rather than despised!

Of course extremes are to be avoided. One should not assume the fawning, hypocritical humbleness of "Uriah Heep," nor the unfeeling brutality of "Old Quilp;" but rather maintain such an air of kindly dignity as will enable him to be firm when necessary without trace of unjustness, and courteous always without sign of timidity or indecision.

Thus far we have considered that part of the subject only which relates to the treatment of our patrons as individuals. Let us now entertain a few thoughts having reference to our treatment of them as a whole. It goes without saying that to be truly successful in any business, and more especially the gas business, one must have the good will of his particular community. To gain and keep this good will I would suggest the following:

*First.*—Give as excellent service as lies in your power. With gas of good quality and at fair price, pressure of proper average, and prompt attention to complaints, you are certainly a long way forward toward that ideal condition which we all so much desire.

*Second.*—Have courteous employes. Never send a man to do fitting, or read indexes, or otherwise represent your interests, who will enter into foolish controversies with the people, thus increasing your work and worry, to say nothing of the loss of patronage which likely will ensue.

*Third.*—Show a real appreciation for all favors received. When a customer pays his bill, *thank him;* if some one speaks a good word for your business and secures another patron, hunt him up at once and express your gratitude, even though it be at the cost of some extra exertion to you. Do not act as though you considered it a mere matter of duty on their part and, therefore, not entitled to any special recognition. People like to be thanked for what they do, and in no way can you more easily repay their present friendliness and insure its continuance for the future than by a proper display of appreciation.

*Fourth.*—Be identified with all worthy local public movements. The gas man cannot afford to "hide his light under a bushel." He must give the public something more for their money than *good gas*—he must give them back a small portion of their money in the form of subscriptions to worthy enterprises, and he must give them *more or less of himself* in *public service* whenever and wherever needed. Nor is this to be viewed as begging the question, or bribing the public. Were it necessary, I believe I could demonstrate that for every dollar judiciously expended in public enterprises two dollars eventually accrue to the earnings of your company; and, were this a discussion of social economy instead of business policy, I could easily show you that every man owes a debt of service to the community in which he lives, and that that debt is greater or less according to his ability and opportunity; and that the man who has character and ability enough to successfully manage so large a business as the gas industry relatively is, in each community where such a company exists, possesses faculties of mind and soul which he is morally bound to use for the common weal of his fellow men.

*Fifth.*—Remember always that man is a social creature; that he is nearest his normal condition when enjoying the pleasures of social intercourse; that he is farthest from his normal condition when he permits himself to become a mere commercial machine (or worse yet, but a part of a machine), without liking or fitness for social enjoyment; that gas customers are but the same as other people in this respect, even though they would sometimes by their actions lead you to think otherwise; and that you cannot do your company, yourself, or your patrons a greater service than to be on terms of social as well as business friendliness.

In conclusion, I would urge upon you the fact that the competition of to-day is of such active and often malicious character, that the demands upon the gas manager are greater and more numerous than ever before. It is said time was when the gas man sat calmly in his office chair, while the people came unto him, and, salaaming very low, begged that they might be privileged to burn his gas, and pay therefor any price he should see fit to ask. But if ever there was such a "rosy" time as this, it was many years ago, and in its stead have arisen conditions and circumstances which make it imperative for the gas man of to-day to seek his patrons with untiring zeal, and having found to guard them with jealous care, lest in a moment of thoughtlessness or neglected opportunity they be suddenly plucked from out his hands, and he be left to mourn for that which was, but is not now, and mayhap shall be no more forever!

The discussion on Mr. Dole's paper was concluded by a vote of thanks to the author. The subject of prepayment meters was then taken up as a topic for off-hand debate. The trend of the speeches was all in favor of the prepayment meter, in that it afforded gas companies a means of securing certain customers not otherwise obtainable under the regular method of gas sales procedure.

An adjournment was here ordered until Thursday, February 17.

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### Second Day—Morning Session.

The President called the meeting to order at 10:30 A. M., February 17. After the transaction of some routine business, the Secretary (owing to the unavoidable absence of the author) then read the following paper, by Mr. Henry G. Beatley, of Marquette, describing

### A CLOSED PURIFYING VESSEL.

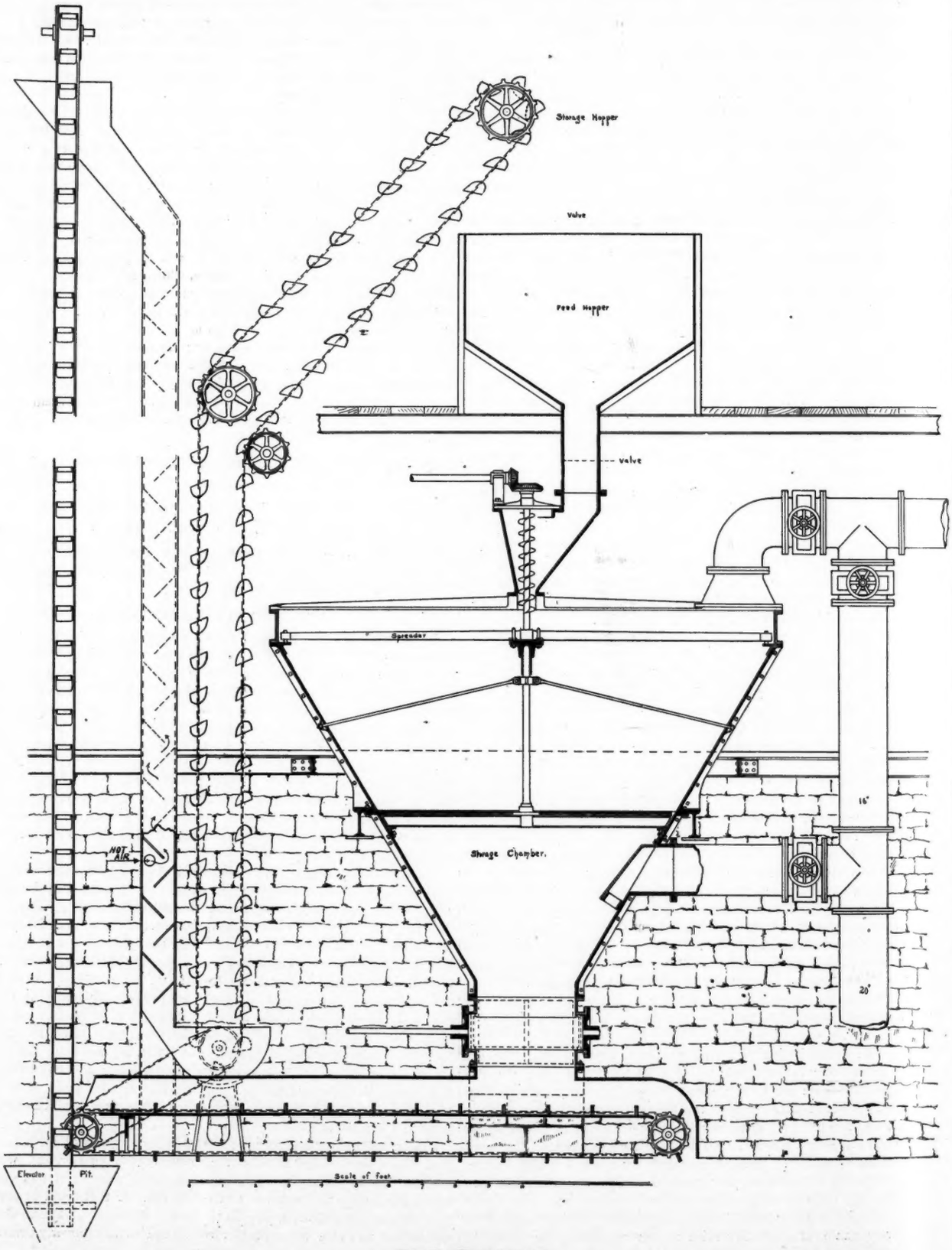
In the year 1858 the works of the Chicago Gas Light and Coke Company were located on Adams street, on ground now occupied by Marshall, Field & Co., and it was my pleasure to make frequent visits there at odd hours; the more so because of the kindly greeting which Mr. Burtis invariably extended, in such a marked contrast to that which was so customary among gas managers during those earlier years. During one of our perambulations, leading through the blacksmith shop, I noted a large frame window in the wall which separated this room from the purifying house, the glass of which was so shattered that scarcely a whole pane was visible. I modestly inquired if there was not some liability, on account of the close proximity of the forge fires, etc.; "Oh, no; there is always some one about. We bank the fires at noon, and at night extinguish them. The conditions are the same as they have been for years," etc.

The conditions, however, were materially changed within the space of two weeks, and there did not happen just then to be "Some one always about." At noon the fire alarm sounded, and I aimlessly wended my way towards the direction given and soon found myself at the gas works. While waiting quietly for the crowd to disperse, and the excitement had been somewhat abated, Mr. Burtis approached, and, scarcely checking himself in his hurried stride across the yard, remarked: "I am going to have that window bricked up," and passed on. I strolled towards the purifying room to find that the roof, which had been lifted bodily, in its descent had landed squarely on the walls, but not in parallel lines; and one of the walls was found to be somewhat out of plumb. No one in the case knew the gun was loaded—a combination as it were of a purifier water seal and a forge fire. That same day I procured my first "Think Seed," and for years after visions of a closed purifying box were before me; but as time passed I often wondered if I had not planted too deep.

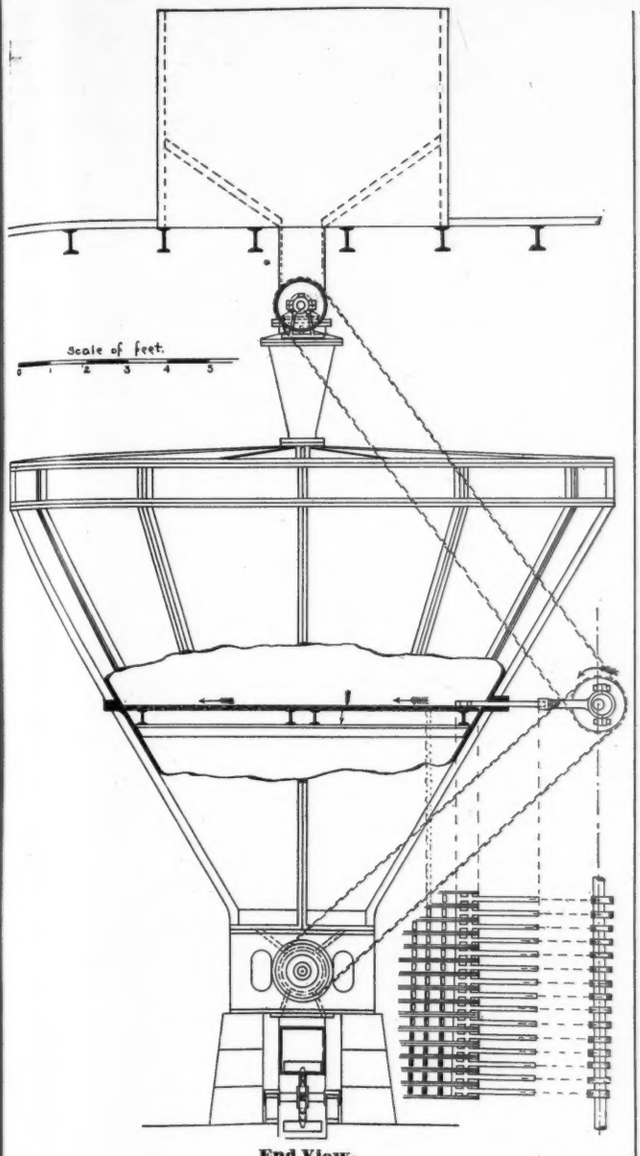
It was not until the summer of 1889 that my apparatus took form. The plan to be conceived was to adopt the operation of a purifier, and work on precisely similar lines with those employed in the washing of gas, viz.: A continuous supply and removal of the material. If that could be perfected then the question followed, why do we need a multiple of boxes; and why cannot the work be accomplished by the use of one properly constructed box, as well as one washer, one condenser and one station meter?

The fact was that if I had a given depth of material and an area of acknowledged capacity for the purpose, charged with properly prepared material (oxide if you please), this single box would continue the work of thorough purification for a given time. This fact established led me to three conclusions: First, that we have never had another substance presented to us (when the cost is considered) that has proved so efficient for the purification of illuminating gas, from sulphur and some of its compounds, as is found in the oxide preparations; second, that the principle of the present application is radically wrong; and, third, that all and every attempt made or suggested to improve upon the purifying apparatus still followed the same lines of application.

Mr. Shelton, in his paper read before the American Gas Light Association,




**Longitudinal Section.**




**End View.**

at the Old Point Comfort meeting, very ably defines the objections to the continued use of purifiers now in vogue. I have read his paper* with a great deal of interest, because it is the first published attempt that I am aware of to lay before any association, or the public, a means by which oxide can be handled and used successfully in closed vessels; and if the present mode of application of the material—viz., placing it upon trays in alternate layers, one above the other—is to be employed, I cannot see why the apparatus he has devised could not be operated with entire success. We cannot but hope that this (the first seed) will germinate and grow until we shall have evolved a perfect and successfully planned apparatus.

There can be no doubt as to the desirability of the construction of some machine the connecting and moving parts of which shall answer fully the purpose of a closed purifying vessel.

We concede that, under any mode of application of the material, both area and depth are positive requirements; but I claim that the manner of application proposed, and which is similar to that employed ever since the introduction of dry material for purification, is contrary to all principles and rules of science. This I desire to make plain to you.

I note in Mr. Shelton's paper that, "In an ordinary box if during the time the oxide is in use it should be spaded and turned over three times before it is discharged as foul, I think it might reasonably be expected that an increase of efficiency in the amount of gas purified per bushel would be found."

> Good sense, which only is the gift of heaven;
> And, though no science, fairly worth the seven.

No one I think can doubt for a moment his hypothesis, and that all the contained material is never fully acted upon to the extent that it otherwise would be, could it be turned over and the less fouled material exposed; but in the act of so turning, no matter how many times, we are sure to contaminate the whole by the already fouled and polluted material.

One important point, however, that was not so fully considered in Mr. Shelton's "Objectionable Features" in the use of the present purifying boxes, was the constantly occurring annoyance and attending extra expense of frequent back pressure. There are no known means of turning over the material and mitigating the evil (for a time at least), other than that proposed in the use of Mr. Shelton's apparatus. The next requisite that would suggest itself is to abandon the saturated and inert material and work upon that which is less fouled.

This would be accomplished by adopting the "Cripps' Gird Valve," with which you are doubtless familiar. He predicates his argument upon the following principle, viz.: "It is a truism that the frequent changing of purifiers, with its incumbent waste of time, labor, and nuisance, is one of the most troublesome as well as costly operations performed in a gas works. Anything that will mitigate the nuisance and expense, by reducing its frequency, will be heartily welcomed by all who are concerned in the management and control of gas works. It often happens that the top layers of purifying material are comparatively fresh and open and would otherwise last much longer than is permitted by the necessity of taking them out simply to renew the bottom or lower layers, which have become so sodden, compact and hard that they resist the passage of the gas and cause excessive back pressure. It is to render these fresher layers available for use that this invention was designed. Each layer of purifying material can be used up, which is effected by by-passing the lower tiers as soon as they become choked. The purifier will then continue to work for a considerable time longer before it is necessary to change it."

There has never yet been a proposition to remove the material first in contact before it shall have become fouled, sodden, compact and hard.

This one fact alone, that this material is not removed before saturation takes place, constitutes the whole process as unscientific, and is based upon two propositions. First; the fundamental principle underlaying the action of contact is a prime factor, and the proper use of the material is limited in just proportion to its activity and power to absorb the desired impurities. That portion of the charge which is first exposed to the entering crude gas soon becomes inert, it no longer acts as a purifying agent, but only as an absorbent, and now affects injuriously the next following material to be acted upon, because the crude gas is in itself contaminated by its passage through the supercharged layer of oxide, and that which follows cannot do its proportion of work; second, the fouling of one or more boxes, or the supercharging of such a large portion of material before any attempt is made to revivify, is also unscientific, for under these conditions oxide can never be brought back to as perfect a state of activity as it is sure to be were it exposed while in a less saturated condition. The duration of exposure of the material to impurities should never continue until none of the foul gases will enter into combination with the oxide, and the less the saturation of the material the less difficult will be the operation of revivification. There is always some portion of the fouled and sodden mass that would be benefited if it were separated before the bulk was bedded preparatory to atmospheric exposure; for, to a certain extent, it is a foul leaven that injuriously affects the whole lump.

To my mind there is no better illustration of this than the manner in which the marine steam boiler is operated. Here saturation of the water by lime is never allowed. To prevent this result the water is extracted periodically or continuously by the brine pump in order to keep the density of the water below the point at which any serious deposit may take place. This would seem to indicate the true principle to be carried out in the use of dry material used for purification; and this is the proposition that I now present to you—namely, a closed purifying vessel, into which the material is automatically fed and simultaneously discharged before any portion of the material has reached the point of saturation or shall have become inert. The material is fed and discharged in quantities commensurate to the amount of gas to be purified, and in a condition so little fouled that perfect revivification is obtained by the use of a current of heated air in contact with the discharged oxide during its passage from the receiving pit to the elevated hopper placed above the purifier.

Some of the advanaages to be derived by the use of the apparatus here presented are the following:

1st. An automatic closed purifying vessel.

2nd. The form of the purifier compels the material to pack well on the sides.

3rd. The quantity of material to be handled is in just proportion to the amount of gas passing through the box.

4th. With clean material always present, a much greater depth of oxide can be employed.

*See *Journal* Nov. 8, 1897, p. 727.

5th. No wet and sodden material accumulating to cause back pressure.

6th. No moisture or saturated material, and no thoroughly fouled oxide presented to the entering gas.

7th. A minimum of air admitted to the box.

8th. Oxide so little exposed can be thoroughly revivified by the specially arranged elevator carrying the oxide to the feeding hopper.

9th. Increased efficiency.

10th. Less quantity of material to be kept in stock.

11th. Saving labor.

12th. No floor space required for revivifying.

13th. Saving of floor space for purifier.

14th. No fouling boxes and less liability of sending out improperly purified gas.

15th. There are no foul emissions of the gases from the spent boxes or from the revivifying floor, which always enter so largely into the objective features of a gas works. The working drawings are not yet fully completed; but the novel features of my closed purifying vessel will be readily understood by an examination of the outline plans which accompany this paper.

The apparatus complete and set up, consists of the following: A purifier proper, which will contain 80 bushels of prepared oxide, and to have a depth of at least 7 feet above the grates. This will be ample for a work whose maximum output is one million cubic feet per day. A storage pit below the basement floor, having a cubical capacity of 125 feet, a conveyer from storage chamber containing the spent oxide to the storage pit, and conveyer from storage pit to supply hopper, which is placed above the feed hopper, the latter being fitted with valve on the top, a feeding screw and valve below the hopper, which connects with the purifier, fitted with a spreader and actuated by its connection with the shaft of feed screw; to this is also attached the feed check. The oxide is discharged by means of a series of flat grates having a reciprocatory movement, revolving bars, on the principle of the "Dockash;" or, preferably, a revolving grate covering the entire opening of the bottom of purifier. From thence the oxide is conveyed into the double-gated receiving chamber, and from there into the storage chamber below the floor, which is on the same level with the storage pit.

The whole operation is simple and needs scarcely any explanation. The storage pit, having received a supply of 100 bushels of prepared oxide, is elevated by means of the conveyer and deposited into the supply hopper, from thence (by gravity) into the feed hopper, from where it passes to the purifier, which is filled to a point indicated by the test hole situated on line of spreader. The purifier and feed hopper having been filled, the upper valve of feed hopper and lower valve of receiving chamber having been closed, we are ready to begin to operate the purifier.

It will be noted that the supply hopper is empty,* ready to receive a supply of revivified material. The movements of the feed-screw and grate are set to their desired velocities, the action of both feeding and wasting commences, and the partially fouled oxide from the purifier is deposited in the receiving chamber below the grates, and is periodically discharged into the storage chamber below as circumstances may require; from here it is conveyed to the storage pit. The capacity of these chambers requires the emptying of the wasted oxide and filling of the storage hopper, never to exceed once in 12 honrs.

The feed screw (the shaft of which propels the spreader) has a vertical movement, and has a check attached which regulates the flow of oxide into the purifier. The feed, when the screw and spreader are at their lowest point, is always in excess of the amount wasted, and to prevent an undue amount being passed into the purifier, the spreader will ride upon the surface of the oxide, by which means it is gradually raised, and the check on the shaft closes the feed passage. In like manner, if at any time the waste should be in excess, the spreader, following the surface of the oxide, thus opening the feed passage, at the same time lengthening the feed screw in tube, increases the supply. The receiving chamber below the grates is of the same capacity as the feed hopper, and is closed by a valve which communicates with storage chamber. The valve of this is worked simultaneously with the valve of receiving chamber, but opposed to each other; and after a run of 12 or more hours, by a full movement of the lever the oxide is dumped into the supply chamber. The conveyer which enters this chamber carries the partially fouled oxide to the storage pit, ready to be elevated to the storage hopper above the purifier, and revivification is effected during this passage. This is accomplished more readily by a series of two elevators. The first carries the material to a point as high as admissible, and it is there discharged into a wooden box, or series of connecting boxes, set at an angle of 30° to 32°, and terminating in a receiver on the floor level into which the second elevator is set. The oxide falls slowly by gravity, and during its descent through the box it is met by a current of air heated to about 300°, the entire length of the box, where it is exposed to the extent that a perfectly revivified mass reaches the receiver, and the conveyer carries it to the storage hopper. This being filled the lower valve or feed hopper is closed and the upper valve opened, and the operation of filling the feed hopper is completed almost instantly. The two valves which are worked together are then reversed and the connection is again made between the feed hopper and the purifier. The operation of feeding at the top and wasting from the bottom, as also the passing of the gas through the purifier, is continuous.

*I was in error when I start the purifier with an empty supply hopper. The purifier and the feed hopper should be full when ready to operate; there should also be a quantity of material in the supply hopper, enough to replenish the feed hopper until a sufficient amount had accumulated in the receiving chamber, which would require to be dumped into the chamber below. The action of revivification can then commence, and before the feed hopper is empty, we shall have accumulated a supply of fresh material in the supply hopper.

It is not required or intended that the conveyers should be run continuously. The capacity of the storage hopper would determine this. Three or four hours only need be required for a thorough revivification of the entire mass.

The discussion brought about by Mr. Beatley's paper was lengthy and general. The consensus of the thoughts advanced by the speakers was opposed to the matters presented by the author. The item of capacity seemed to be the main point upon which objections were hung. One member, however, expressed emphatically his belief that a tendency existed towards the building of mechanical, continuous purifying machinery, and asserted that improvements in the construction of purifying apparatus would be on the lines that he indicated. On motion, a vote of thanks was passed to Mr. Beatley. The Secretary read a letter from Mr. A. P. Lathrop, Secy. of the Chio Gas Light Association, inviting the Michigan Association to attend the 14th annual meeting of the Ohio Association, at Cleveland, Ohio, March 16 and 17. An invitation from Mr. W. E. Holmes, Secretary of the Texas Gas and Electric Light Association, to attend the meeting of that Association in Laredo, Texas, March 9, 10, 11 and 12, was also read—the meeting of the Texas Association was planned to include a joint session with the street railway interests of Texas and Mexico. A telegram from Secretary Prichard, of the New England Association of Gas Engineers, in session at Young's Hotel, Boston, in reply to a telegram of congratulation previously sent by the Michigan Association, was read and received with applause. Next in order on the programme was the paper, by Mr. Robert Calhoun, of Bay City, who recited a chapter of "Reminiscences." The story was most amusing, but owing to the somewhat personal nature of many of its details, which concerned persons still active in the gas business, Mr. Calhoun preferred not to have it printed. A vote of thanks having been passed to Mr. Calhoun, the President called for the report of the Committee on Tar. It having been explained that the Committee did not have anything like sufficient time for even a superficial examination of the subject, it was voted that the Committee be continued, to report next year. The Committee on

### Next Place of Meeting

reported in favor of Lansing, Mich., and the report was unanimously endorsed. The Committee on Nominations reported the following list of

### Officers for the Ensuing Year:

*President*—C. H. Raynor, of Adrian, Mich.
*Vice-President*—L. E. Walker, of Lansing, Mich.
*Secretary and Treasurer*—H. H. Hyde, of Saginaw, Mich.

The gentlemen named having been regularly elected, Mr. Joseph Walker invited the members to visit the Port Huron Club after adjournment. Secretary Hyde announced that he would himself "photograph" the Association, the grouping to be made on the steps leading to the hotel entrance, the picture to be taken just before dinner.

### Report of Committee on President's Address.

The Committee on President's Address submitted the following report, which was, on motion, adopted:

Gentlemen: The Committee to whom was referred the Address of the President beg leave to report that they heartily concur in the recommendations of our President, and call especial attention to the statement, "That the object of this Association is not to gather together for banquets and entertainment, but for the presentation of matters of current and practical interest to the gas companies of the State. That what we need is to get acquainted and to be able to compare results and to ask questions, which in large Associations are too well understood to need answers."

That the recommendations in regard to unaccounted for gas are timely, and should receive the careful attention of every Superintendent in this State.

That the condemnation of the course pursued by some of the gas companies in the disposal of their surplus tar is just, and we recommend this Association to use all proper means to correct this wrong.

The finances of the Association permitting, we recommend the printing and distributing of papers to be read at the meeting of the Associa-

tion; said printed copies to be mailed to each member on or before February 1st each year.

That we thank our President for his devotion to the interests of this Association, and for his business-like and practical address, and recommend that the same be published with the proceedings of this Association.

S. Dean,
W. H. Morgans,
Robt. Calhoun,
} Committee.

It was voted that the papers and President's address to be read at subsequent meetings be printed and mailed to members on or before February 1st of each year. The Secretary announced that an executive session (for participation only by active members) would be held immediately after adjournment. The President named Messrs. T. B. Guitteau, J. J. Knight, J. C. Sterling, S. E. Wolff, A. L. Zwisler, F. G. Corbus and E. G. Van Wie to prepare papers for the next annual meeting. Votes of thanks were then passed to Mr. Jos. Walker, for his courtesy to the Association, and to the retiring officers for their successful efforts on behalf of the Association. The Association then adjourned, to reassemble in executive session, which session lasted about an hour.

## Services and Fittings in Germany.

The *Gas World* says that at the Leipzig meeting of the German Gas and Water Association, Herr Dellmann, Manager at Duisberg, read, on behalf of the Heating Committee of the Association, a report on services and fittings in the principal towns of Germany. From this paper we take the following information, which will illustrate the curiously careful and methodical way in which our German brethren go to work.

In all cases, so far as known, the gas works do all the service work—from the main to the meter—at the joint cost of the works and the consumer. The part done by the works is, in some instances, to put in the connections gratuitously, up to a height of 80 inches above the floor level. The fittings beyond the meter are sometimes put in by gasfitters, but mostly by the gas works people. In the larger towns there are municipal by-laws as to putting in services and fittings. In Dresden, Hamburg and Colmar the gasfitters have to be licensed by the town, and if they do not obey the regulations they may lose their license. In Dresden fitters are punished by an $8.75 fine, or by imprisonment, for acting without a license.

*Material and Size of Pipes.*—As to the material of the service pipes, wrought iron is exclusively or generally used; in some exceptional cases hard soldered or cast brass or copper tubes, not lead, which is everywhere prohibited for service pipes, except in Stuttgart, where heavy lead pipes may be used, running through hollow chambers, under circumstances where the other metals would be attacked by acid vapors, and not otherwise. The connection between the service pipe and the meter may, however, be made by thick lead piping, not exceeding 40 inches in length. Zinc coated tubes are much used where the pipes pass through damp rooms or are let into the wall or ceiling.

As to the size of the pipes, the least clear diameter allowed in Dresden is 0.36 inch; in Stuttgart, Hamburg and Carlsruhe, 0.24 inch. In Stuttgart tubes under the floor must not have less than 0.40 inch clear diameter.

As to the junctions of pipes, these must be screwed up with tow and oil, or with white lead or red lead luting. It is not allowed to use iron or cement, or to employ soft solder or tin in soldering up or in stopping leaks. The lead piping at the meter must be screwed on the iron pipe with a brass nut, soldered outside the end of the lead piping.

*Position of Pipes.*—As to the position of the pipes, they must generally, within buildings, remain exposed. They must have a certain slope; in Hamburg not less than 1 in 1,000; in Berlin not less than 1 in 100. Where the slope is broken, or where the pipe passes from a warm room into a cold, there must be a water collecting arrangement placed in the warm room. In Hamburg all pipes above 0.76 inch must have a standard pattern water collector, with means of letting the water off; this is, under no circumstances, to be let into the wall. There must be sufficient play to prevent any pipe which passes through a wall from being injured by any settling down of the wall. When a pipe traverses an inaccessible hollow space, or goes through a thick wall, it must lie in a metallic sheath, open at both ends, airtight throughout its length, and about 0.40 inch wider than the gas pipe. In Hamburg no pipe can be laid through a chimney, or in chimney sidepieces, or under a hearth or stove, or through any inaccessible hollow space; and when pipes are laid under the floor the boards above the pipe must be so left that they can at once be taken up to expose the pipe in its whole length; but brass screws may be used, which do not rust fast. In Dresden, if it is desired to lay pipes under flooring, plaster work, ceilings, or under anything which would make the pipe difficult to get at, the municipal authorities must be specially consulted; and no permission can be given for pipes less than 0.76 inch clear bore. Loose ends of piping not in use must be secured by a proper cap or plug. A stopcock must be fixed near the meter, on the service pipe. A stopcock must also be fitted for each story; and rubber gas tubing must always have a stopcock (Carlsruhe). In Hamburg there must be a stopcock to shut the gas off from the street; every meter must have its own stopcock; all stopcocks must have the same clear bore as the pipes they are on, and must work with only quarter turns and catches, so that they cannot be turned right round. The head of the stopcock must be so shaped that it is easy to know in the dark whether the gas is on or off. In Stuttgart appliances seldom used must each have a stopcock.

*Position of Burners.*—Lamps must be fastened to ceilings and walls by means of discs which are screwed and not nailed on, and which must not be fastened to plaster. Heavy chandeliers must have a mother-screw going right through the beam above. Ball joints must have complete balls. Lamps with hydraulic seal must be filled, not with water, but with glycerine or such oil as will not evaporate and will not resinify. Movable wall lamps must be so fixed as to exclude the possibility of the flame reaching wood or other inflammable substances (Stuttgart). In Hamburg every lamp must be tested to see whether it is gas tight. If the ceiling is less than 34 inches above the flame, or if it is not plastered, a hanging shade must be used above the flame. Chandeliers must not hang upon the gas pipe (Dresden). In Carlsruhe open flames may be prohibited in particular places; and shop windows lit by gas must be specially ventilated. In Dresden and Leipzig the flame must not be nearer than 12 inches to a plastered ceiling, or 24 inches to a wooden one; and in the latter case there must be a metal shade above the flame. All wood must be at least 7½ inches from the flame, laterally, and at the same time there must be a metal shield, at least 12 inches broad, fitted at a distance of 1.2 inch from the wood. Dangerous work (inflammable liquids, etc.) must be lit up through strong double glass lanterns outside, and lit only from the outside, with an outside escape for the products of combustion. When there is an escape of gas, no light is allowed near until there has been free ventilation. After an explosion no gasfitter is to do anything except shut the main stopcocks, but is to leave things as they are until the police or the gas inspector has examined the state of affairs and given him their express permission.

*Compulsory Testing.*—As to testing the fittings, this must be done, in Carlsruhe, at every alteration of the fittings within a building, whenever pipes which have been more than six months out of use are to be used again, and whenever alterations have been made in parts of the building containing gas pipes. In all these cases notice must be sent to the gas works; the inspector will examine, and either give a written permit to use the gas or refuse it; if he refuses, there is an appeal to the local authority. Before testing there must be no painting or plastering over the pipes, or anything rendering it difficult to get at them. It is an offence to use gas until the written permit is obtained. The charge for testing varies from 62½ cents for 1 to 10 flames to $1.50 for 60 to 100 flames, and 12½ cents for every additional 50 flames. The plumber must be present, with men and tools ready, to do what is needed. The passing of the fittings for use does not exempt the plumber from liability on the ground of questions of skill or of material. In Dresden, if the pipes are found painted or plastered over, the required permit is at once refused, except in the case of pipes going through walls. The permit is fixed inside the door of the gas meter. In Leipzig the rules are much the same; but the connections of the meter and the setting up of the meter are also subject to this control. In Hamburg, before the lamps are put up, the pipes must be tested with a pressure of 14 inches of water, and it must be shown that all parts of the system are under this pressure, that there is no obstruction, and no water in the pipes. When everything is put up, all the burners must be lit at the same time, to see that all works well; then all the flames are to be put out, and the meter carefully watched to see if there is any leakage. If the meter turns at all the leak must be found. The fines for breaking the regulations run up to $37.50, or imprisonment. Plumbers are responsible for neglect of their workmen.

Mr. James Graham, a Director in the Allegheny (Pa.) Gas Company, died at his home in Allegheny about a fortnight ago. He settled in Allegheny in 1841, and amassed a fortune in connection with the business of manufacturing salt; the firm name of the concern having been Graham & Courtney.

## ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

THE City Council, of Wooster, Ohio, invites proposals for lighting the streets by means of electricity.

AT a meeting of the Board of Directors of the Consolidated Gas Company of New Jersey, held March 1st, Mr. Fred. B. Wheeler was elected General Manager, to succeed Mr. Paul Doty, and Mr. C. Henry Irwin was elected Treasurer, succeeding Mr. Frank C. Tomlinson, resigned. Mr. William B. Tuttle was appointed Superintendent of the gas department in Long Branch; and Mr. Edward C. White, formerly Secretary of the Fresno (Cal.) Gas and Electric Light Company, was appointed Bookkeeper at Long Branch. As hitherto reported in the JOURNAL, Mr. Doty has been appointed General Manager of the Grand Rapids (Mich.) Gas Light Company, and Mr. Tomlinson has accepted the position of Cashier to the First National Bank of Ironton, O.

MR. R. H. AARONSON, has been appointed Superintendent of the Bordentown (N. J.) Gas Light Company, vice the late Mr. J. O. Hudson.

MRS. HELEN ARMSTRONG, the expert teacher of cookery, writing to the JOURNAL, from Murfreesboro, Tenn., under date of the 4th inst., says: Enclosed please find $— for "ad." similar to one inserted for me last month. I find it an excellent investment and am making several contracts through it. * * * I have just completed an exceptionally successful course here for a Society, and am to lecture at the Pure Food Show in St. Paul next week. I have really met with unusual enthusiasm and interest here, and am receiving requests from other Southern towns through it. * * *

THE estimated cost of lighting the streets of Hartford, Conn., for the ensuing year, is $56,321.30.

AT an adjourned annual meeting of the Ogdensburg (N. Y.) Gas Company the officers chosen were: Directors, H. A. Sage and Henry Green, of Easton, Pa.; and J. Y. Chapin, J. M. Kellogg and R. E. Waterman, of Ogdensburg; President, H. A. Sage; Secretary, J. Y. Chapin; Treasurer, H. A. Sage.

IN the proposals submitted to intending bidders for the public lighting of Bridgeport, Conn., provision was made for estimates for furnishing 100 or more Welsbach lamps, of not less than 60-candle power, with all necessary fixtures and appliances of the latest and most approved design. Bidders were to give prices for one, three and five years for each lamp, both with single and double burners, and to include the furnishing of the illuminant, globes and lamp posts and for the setting, resetting or removal of same, and for the lighting, extinguishing and maintenance of said lamps.

MR. G. W. RICHARDSON has renewed his application to the City Council of Rossland, B. C., for the right to construct and operate gas works in Rossland for a period of 10 years. The gas is to have a minimum illuminating value of 16 candles, and the selling rate is not to exceed $2.50 per 1,000 cubic feet. Construction work is to be commenced within six months after the passage and acceptance of the ordinance, and the works are to be completed within 2 years. Gas is to be supplied to the public lamps, provided 25 lamps are maintained, at the rate of $3 per post per month; but if over 30 lamps are used the rate per month per lamp is to be $2.50. The corporation is to have the privilege of purchasing the plant at any time within 10 years, the price to be decided by arbitration.

MR. JOHN W. MYERS, Assistant Superintendent of the Belvidere (Ills.) Gas Company, died in Belvidere on the morning of February 25th.

MR. J. A. JONES has secured a franchise for the construction and operation of a gas works in Escondido, Cal. The selling rate was adjusted at $2.50 per 1,000 cubic feet. Escondido is a post village of San Diego county, Cal., and is about 65 miles distant from San Diego. Its population does not exceed 1,100.

THE Massachusetts Legislature has rejected the bill proposing to prohibit the manufacture and sale of gas containing more than 10 per cent. of carbonic oxide.

THE Pittsburgh (Pa.) Fuel Gas Company has been incorporated by Messrs. W. P. Patten, Joseph Keeling, W. A. Dinkel, Patrick Ridge and F. L. Slocum.

L. S. TURNER, writing to us, under date of March 2, from Portland, Oregon, says: "At a regular meeting of the City Council of Nelson, B. C., held the last week in February, the Public Works Committee reported, recommending that the application of H. J. Evans for a gas franchise be granted, on the following conditions: That the works be started within 6 months and completed within 2 years; that the pipes and mains be laid on alleys and lanes; that a bond be given assuming responsibility for accidents; that the Company pay to the city 3 per cent. of the gross receipts for the first 2 years, and 5 per cent. for the succeeding 8 years; that the city have the privilege of purchasing the plant at any time during the continuance of the franchise at a price to be determined by arbitration. The report was adopted, and if the projectors of the Company accept the proposition a by-law will be prepared granting the franchise."

THE United Gas Improvement Company has acquired the property of the First Baptist Church, corner of Broad and Arch streets, Philadelphia. The purchase price is said to have been something under $300,000. It is the intention of the Company to construct on the site named a handsome and commodious office building, mainly for its own uses. The location is an excellent one.

THE annual meeting of the Providence (R. I.) Gas Company was held on Monday, March 7th. The 51st annual report to the shareholders, which was read by the President, Mr. Royal C. Taft, showed that during the year 557,259,700 cubic feet of gas had been sold, an increase of 6,264,900 cubic feet over the quantity sold the previous year. The unaccounted-for gas was returned at 4.95 per cent. The weight of gas coal carbonized was 26,809 tons; in the manufacture of water gas 2,908 tons of Lehigh coal, 191,681 bushels of coke and 1,689,735 gallons of naphtha were used. About 9 miles of main pipe were laid during the year, the Company's total mileage now being 242. The number of meters in use is returned at 22,903, and on January 1st there were 10,816 gas stoves in use. The franchise tax paid to the city during the year was $16,790.59, and the total amount paid on such account, from the time the new agreement between the city and the Company was reached, aggregates $91,389.24. The following Directors were chosen: William Goddard, Alpheus B. Slater, Royal C. Taft, Edward Pearce, Jesse Metcalfe, Geo. W. R. Matteson, Lucian Sharpe, Newton D. Arnold and J. Edward Studley.

EARLY this month all the properties and rights of the Thomasville (Ga.) Gas Company were transferred to the Thomasville Electric Light Company. This deal puts the latter in complete control of the lighting business of Thomasville.

AT the annual meeting of the Nashville (Tenn.) Gas Company the following Board of Directors was elected: Thomas H. Malone, E. W. Cole, O. F. Noel, J. H. Fall, J. B. Richardson, J. H. Thompson and W. D. Talbot; President, Thomas H. Malone; Vice-President, John Thompson. This list shows that the former management has been completely superseded, and the main significance of the change is that the Company, a controlling interest in which had been offered to capitalists representing an outside syndicate, will remain under those who have been less or more interested in its fortunes for many years.

THE Brooklyn (N.Y.) Borough Gas Company has been incorporated, with a capital of $500,000, by Messrs. Samuel B. Lawrence, F. P. Lowrey, A. Matthews, H. M. Haviland and Jno. B. Summerfield.

THE Alton (Ills.) *Republican* for March 2d says: "A rather sensational action was brought in the City Court yesterday, when the Alton Gas Light Company confessed a debt for a large sum of money. The proceeding was precipitated by the appearance of the Alton Railway and Illuminating Company on one count, and Joseph F. Porter on another filing claims for debt against the Gas Company aggregating $18,000. Mr. H. S. Baker brought suits for the plaintiffs, and Mr. Levi Davis, in behalf of the defendant, acknowledged the claim as a just one, whereupon Judge Hope entered judgment against the Company for the full amount claimed."

A CORRESPONDENT forwards the following under date of the 6th inst.: "The following circular has been sent to the shareholders of the Charlestown (Mass.) Gas and Electric Company: 'It is deemed for the best interests of the stockholders of the Charlestown Gas and Electric Company to prevent the purchasing of a majority of the stock by per-

sons who may desire to use the same in a manner detrimental to the interests of the Company and of the holders of a minority of the stock, or in case of the sale of any of the shares to secure for all the shareholders who may desire to avail themselves of the privilege an opportunity to sell their shares at a uniform price to be agreed upon. The undersigned therefore invite the co-operation of all stockholders, and request them to sign the accompanying agreement and power of attorney, and to return the same at once with the certificate of stock held by them to George B. Neal, Charlestown, Mass. A proper receipt will be returned thereupon. Jas. F. Hunnewell, Jas. A. Sawtell, George B. Neal, Trustees.' The agreement referred to was in effect that the 'undersigned' deposited their stock with the trustees named, constituting them their attorneys, to sell, assign and transfer the number of shares set against their names; and they are fully empowered to make and pass all necessary acts for any assignment and transfer of said stock, provided that none of it shall be sold for less than $90 cash per share. And this authority and power shall extend for one year from March 1, 1898, and all dividends declared upon such stock shall be paid to the owners thereof during the continuance of this trust. This agreement is necessary for the mutual benefit and protection of such of the stockholders of said Company as shall execute the same, and opportunity shall be given to all stockholders to join them, but it shall not be binding unless signed by a majority in interest of such stockholders."

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THE Exeter (N. H.) Gas Company has submitted to the Selectmen the following propositions for the lighting of the streets: 176 Welsbach lamps.—Moon schedule; one year contract, $3,500; five year contract, per year, $3,000—time of extinguishing, midnight. All night lighting, 25 nights per month; one year contract, $5,000; 5 year contract, per year, $4,500.

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THE Supreme Court of New Jersey has decided that the ordinance passed by the Dover (N. J.) Council, granting to the Dover Electric Light Company the "exclusive right, liberty and privilege, for and during the term of 10 years, to construct, lay and at all times to keep and maintain its gas mains through and under the surface of any and all streets, lanes, alleys and squares of said city," cannot be legally maintained.

---

THE contract for the public lighting of Troy, N.Y., has been awarded to the Troy Gas Company. The agreed on prices are: Arc lights for street lighting, first year, 37½ cents per light per night; second year, 36½ cents per light per night; third year, 35 cents per light per night. Gas for the city hall and other public buildings, $1.25 per 1,000 cubic feet; gas for street lamps, 7½ cents per lamp per night; electricity for public buildings, ½ cent per ampere hour.

---

THE plant and franchises of the Montgomery (Ala.) Light Company have been purchased by the proprietors of the Mutual Light and Power Company, which concern has hitherto been furnishing electric currents for light and power uses in Montgomery. Under the purchase named the Mutual Light and Power Company will have a monopoly of the gas and electric business in Montgomery. The officers of the Mutual Light and Power Company are: Directors, T. E. Hamilton and J. Slagle, of Baltimore, Md.; and J. T. Roquemore, W. F. Vandiver, C. G. Abercombie, Jacob Griel, F. M. Billing, H. C. Tompkins, S. Roman, E. B. Joseph, H. C. Davidson and R. M. Henderson, of Montgomery; President, W. F. Vandiver; Vice-President, C. G. Abercombie; Treasurer, F. M. Billing; Secretary, B. S. Maultsby.

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SOME days ago it was reported that a syndicate headed by L. Z. Leiter and George E. White, both of Chicago, had offered $7,000,000 for the capital stock of the Washington (D. C.) Gas Light Company. Subsequently Mr. McLean, of the Washington Company, emphatically denied that any proposition looking to a change in the ownership of the Company was being considered. We should think not, at the reported bid price.

---

THE official records have it that the Yukon Gas Light and Fuel Company has been incorporated by Messrs. George Dawson, J. H. Lounge, J. H. Smith, H. S. Kozminsky and Herbert Choynsky. The capital stock is put at $500,000; and the principal place of business is returned as San Francisco.

---

MANAGER JOHN A. BRITTON, of the Oakland (Cal.) Gas Light and Heat Company, has arranged for a considerable addition to the Company's generating plant.

AN opposition concern, the title of which is the Citizens Gas Company, is attempting to secure an enabling ordinance to supply gas in Pottsville, Pa.

---

THE new holder for the Hamilton (Ohio) Gas Company is completed.

## Notes on Boiler Furnaces.

The *Engineer* says that anyone who compares the innumerable varieties of furnaces used in connection with steam boilers must be convinced that the fundamental principles involved in the efficient combustion of fuel are either most imperfectly understood, or else the knowledge is not generally disseminated, for the considerations which seem to have inspired various designers are sometimes diametrically opposed.

In some instances the idea seems to be that the best result will be obtained by bringing the boiler's surfaces into as close proximity with the fuel bed as practicable, and we see the furnace surrounded with water tubes and firebox surfaces to receive the full benefit of the radiant heat.

In other cases the furnace is removed entirely from the boiler proper, and only the burning gases are permitted to reach the heating surface of the boiler. Forced draft has its advocates, as also slow combustion, and altogether there seems to be a general diversity of opinion as to the best arrangement to be adopted.

When we consider the conditions under which combustion is most efficiently effected, however, there are certain considerations which can hardly be overlooked. A high temperature is a practical necessity for the thorough combustion of carbon, and this, with the presence of sufficient oxygen, will insure a complete and efficient burning of the fuel.

How can this high temperature be secured and maintained? Certainly not by the close proximity of cooling srfaces, but possibly by providing surfaces which absorb and retain heat, producing a cumulative effect which, like a sort of thermal flywheel, will equalize the always varying temperatures of the furnace.

A few simple experiments which may, and indeed are, made in any laboratory will at least serve to establish some fundamental principles which might well be borne in mind in connection with the design of furnaces to be used in connection with steam generators.

If we take a clear burning gas flame and hold over it a porcelain dish containing water we can easily see how promptly a coating of black soot is deposited upon the cold surface, showing at once how the temperature of the flame has been lowered until it can no longer consume all the carbon supplied to it. If, on the contrary, we take a piece of dry porcelain, such as a porcelain crucible, the small quantity of soot which is first deposited will soon disappear as the clay becomes heated, and every workman knows how effectively the heat of a fire can be reinforced for brazing, welding and similar operations by suspending a piece of firebrick over the proper place, to absorb and reflect the heat, which would otherwise be lost.

This principle has almost of necessity been incorporated into furnaces for burning wet fuel, such as spent tanbark, or bagasse from the sugar mills. Such fuel, which could hardly be burned at all directly under a boiler, can be fed into a separate furnace with arched roof of firebrick of proper height, and when the walls and roof of the furnace have once been heated almost to incandescence the fuel, containing sometimes 50 per cent. of moisture, can be efficiently and advantageously burned.

It must be remembered that the temperature of the heating surface of a steam boiler is little, if any, hotter than that of the steam within it; or, for example, less than 350° F. for a pressure of 100 pounds per square inch. Compared with the temperature of 2,000° to 3 000°, which is practically necessary for the most efficient combustion, it will be seen how greatly the boiler will chill the furnace, unless properly constructed.

Some may say that that is just what is desired—*i. e.*, that the boiler shall abstract as much heat as possible from the fire, and at the proper time this is indeed true. The gases which should be so hot when over the fuel bed should not be hotter than 500° to 600° by the time they escape from the chimney, and the boiler should have absorbed the difference. But the boiler should not begin to pull heat from the burning fuel before the combustion is completed, for if it does the combustion will be checked and the efficiency reduced.

When possible the furnace should be so constructed that the burning fuel may be surrounded with surfaces which can be raised to a temperature as high as possible, and the products of combustion should be delivered into contact with the heating (and cooling) surfaces of the boiler only after the combustion has been thoroughly effected. When this cannot be done, at least the distance from the grate to the boiler shell should be made sufficient to give the fuel a chance to burn, and where even this cannot be done it is hardly reasonable to expect high furnace efficiency.

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A. M. CALLENDER & CO.,
PROPRIETORS.

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PACIFIC COAST GAS ASSOCIATION.
TEXAS GAS AND ELECTRIC LIGHT ASSOCIATION.

MONDAY, MARCH 14, 1898.

## The Market for Gas Securities.

The rumors and signs of war have put to rout all ordinary reasonings over stock values, and the result is that quotations are altogether in line with depression. Gas shares have suffered with the rest, the shrinkage in some instances having been quite important. Consolidated opened to-day (Friday) at 180 to 180¼, and at 10 o'clock sales were made below 179. The fact, however, is that Consolidated was never more of a purchase than it is to-day; for the amalgamation of the city's gas interests cannot be delayed much longer. Mutual sold off somewhat during the week as did Equitable, while East Rivers and Standards were steady. The Assembly refused yesterday to discharge the Committee on Gas, Water and Electricity from further consideration of the dollar gas bill. Mr. Nixon's well put together speech in opposition to the resolution should be read by all interested in city gas shares.

Brooklyn Union remains at the recently ruling low figures quoted for it, and no one can make a mistake who now purchases it. Peoples, of Chicago, is at the ridiculously low figure of 90 bid. On the whole, gas shares have kept nearer to fair values than any other class of securities on the general trading list.

## Gas Stocks.

**Quotations by Cochran & Close, Brokers and Dealers in Gas Stocks.**

35 WALL ST., NEW YORK CITY.

MARCH 14.

☞ All communications will receive particular attention

☞ The following quotations are based on the par value of $100 per share.

| *N. Y. City Companies.* | *Capital.* | *Par.* | *Bid.* | *Asked.* |
|---|---|---|---|---|
| Consolidated | $36,230,000 | 100 | 179 | 180 |
| Central | 500,000 | 50 | | .. |
| " Scrip | 220,000 | .. | 100 | . |
| Cental Union, Bonds, 5's | 3,000,000 | 1,000 | 101 | 103 |
| Equitable | 4,000,000 | 100 | 217 | 225 |
| Bonds, 6's | 1,000,000 | 1,000 | 105 | .. |
| " 1st Con. 5's | 2,300,000 | 1,000 | 114 | . |
| Metropolitan Bonds | 658,000 | .. | 108 | 112 |
| Mutual | 3,500,000 | 100 | 315 | 325 |
| " Bonds | 1,500,000 | 1,000 | 100 | 102 |
| Municipal Bonds | 750,000 | . | .. | . |
| New Amsterdam Gas Co. | 13,000,000 | 100 | 30½ | 32½ |
| Preferred | 10,000,000 | 100 | 67 | 68½ |
| Bonds, 5's | 11,000,000 | 1,000 | 99 | 101 |
| Northern | 150,000 | 50 | | |
| " Bonds | 150,000 | 1,000 | .. | |
| Northern Union, Bonds, 5's | 1,250,000 | 1,000 | 94½ | 95½ |
| New York and East River | 5,000,000 | 100 | 81 | 83 |
| Preferred | 2,000,000 | 100 | 112 | 115 |
| Bonds 1st 5's | 3,500,000 | 1,000 | 111 | 113 |
| " 1st Con. 5's | 1,500,000 | .. | 107 | 108½ |
| Richmond Co., S. I. | 348,650 | 50 | 70 | .. |
| " Bonds | 100,000 | 1,000 | .. | .. |
| Standard | 5,000,000 | 100 | 135 | 141 |
| Preferred | 5,000,000 | 100 | 155 | 161 |
| Bonds, 1st Mortgage, 5's | 1,500,000 | 1,000 | 114 | 115 |
| Yonkers | 299,650 | 50 | 130 | |
| *Out-of-Town Companies.* | | | | |
| Brooklyn Union | 15,000,000 | 100 | 115 | 116 |
| " " Bonds (5's) | 15 000,000 | 1,000 | 112½ | 113 |
| Bay State | 50,000,000 | 50 | 3⅛ | 3½ |
| " Income Bonds | 2,000,000 | 1,000 | .. | 75 |
| Boston United Gas Co.— | | | | |
| 1s Series S. F. Trust | 7,000,000 | 1,000 | 89 | 90 |
| 2d " " " | 3,000,000 | 1,000 | .. | 70 |
| Buffalo City Gas Co. | 7,000,000 | 100 | 27 | 29½ |
| " " Bonds, 5's | 7,000,000 | 1,000 | 95½ | 96 |
| Central, San Francisco | 2,000,000 | .. | 95 | .. |
| Chicago Gas Co. Guaranteed Gold Bonds | 7,650,000 | 1,000 | 104 | 104¼ |
| Columbus | 1,069,000 | . | 89 | 91 |
| 1st Mortgage | 1,085,000 | .. | 101 | 103½ |
| Consumers. Jersey City | 2,000,000 | 100 | 78 | 83 |
| " Bonds | 600,090 | 1,000 | 102½ | 105 |
| Cincinnati G. & C. Co. | 8,500,000 | 100 | 204½ | 205 |
| Consumers, Toronto | 1,600,000 | 50 | 184½ | 187 |
| Capital, Sacramento | 500,000 | 50 | .. | 35 |
| Bonds (6's) | 150,000 | 1,000 | .. | .. |
| Consolidated, Baltimore | 11,000,000 | 100 | 55 | 56 |
| Mortgage, 6's | 3,600,000 | .. | 107 | 107½ |
| Chesapeake, 1st 6's | 1,000,000 | .. | .. | .. |
| Equitable, 1st 6's | 910,000 | .. | .. | .. |
| Consolidated, 1st 5's | 1,490,000 | .. | .. | .. |
| Consolidated G. & E. Co.'s., Little Falls, N.Y. | 90,000 | 100 | .. | 100 |
| Bonds | 75,000 | .. | .. | 100 |
| Detroit | 4,000,000 | | 56¼ | 56½ |
| " Con. Bonds | 4,312,000 | .. | 100 | .. |
| Equitable Gas & Fuel Co., Chicago, Bonds | 2,000,000 | 1,000 | .. | 101 |
| Fort Wayne | 2,000,000 | .. | 78 | 81 |
| " Bonds | 2,000,000 | .. | 89 | 91 |
| Hartford | 750,000 | 25 | .. | 145 |
| Indianapolis | 2,000,000 | .. | 115 | 125 |
| " Bonds, 6's | 2 650,000 | .. | 106 | 107 |
| Jersey City | 750,000 | 20 | 180 | .. |
| Lafayette Gas Co., Ind. | 1,000,000 | 100 | 78 | 83 |
| Bonds | 1,000,000 | 1,000 | 89 | 92 |
| Louisville | 2,570,000 | 50 | .. | .. |
| Laclede, St. Louis | 7,500,000 | 100 | 42 | 43 |
| Preferred | 2,500,000 | 100 | 91½ | 92 |
| Bonds | 9,034,400 | 1,000 | 102 | 102½ |
| Montreal, Canada | 2,000,000 | 100 | 200 | . |
| Newark, N. J., Gas Co. | 1,000,000 | .. | 200 | 220 |
| Bonds, 6's | 4,000,000 | .. | 128 | 130x |
| New Haven | 1,000,000 | 25 | 252 | .. |
| Oakland, Cal. | 2,000,000 | .. | 53½ | 54 |
| " Bonds | 750,000 | .. | .. | .. |
| Peoples G. L. & Coke Co., of Chicago | 25,000,000 | 100 | 90⅛ | 90¼ |
| Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage | 20,100,00 | 1,000 | .. | 108 |
| 2d " | 2,500,000 | 1,000 | 104 | 105 |
| Peoples, Jersey City | 500,000 | 50 | .. | 175 |
| Rochester Gas & Elec. Co. | 2,150,000 | 50 | .. | .. |
| Preferred | 2,150,000 | 50 | 83 | .. |
| Consolidated 5's | 2,000,000 | .. | 87½ | 90 |
| San Francisco, Cal. | 10,000,000 | 100 | 94 | 94½ |
| St. Paul Gas Light Co. | 1,500,000 | 100 | 49 | 51 |
| 1st Mortgage 6's | 650,000 | .. | 84 | 87 |
| Extension, 6's | 600,000 | .. | .. | .. |
| General Mortgage, 5's | 2,400,000 | . | 88 | 90 |
| Syracuse, N. Y. | 2,500,000 | 25 | 17 | 20 |
| Bonds | 1,000 000 | .. | 94 | 97 |
| Washington, D. C | 2,000,000 | 20 | 250 | .. |
| Western, Milwaukee | 4,000,000 | 100 | 82 | 84 |
| Bonds, 5's | 3,556,000 | . | 103 | 104 |
| Wilmington, Del. | 550.000 | 50 | 200 | |

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**DIVIDEND NOTICE.**

OFFICE OF WELSBACH LIGHT CO., DREXEL BUILDING, PHILA., March 9, 1898.

The Directors have this day declared a dividend of One Dollar per share, payable March 25, 1898, to stockholders of record at the close of business March 15th. Checks will be mailed.

1188-2 EDWARD C. LEE, Treas.

**MRS. HELEN ARMSTRONG,**

Teacher of Cookery.

**Demonstration Lectures for Gas Companies a Specialty.**

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**Position Wanted**

**As Superintendent of a Gas Works or a Gas and Water Works**

by a man who has had 15 years' experience in building and managing gas works. Is a graduate of the University of Pennsylvania, from Civil Engineering division.

1188-1t Address "C.," care this Journal.

**CALIFORNIA GAS INVESTMENT.**

The undersigned will be pleased to hear from parties desiring to invest, or engage personally, in the gas business in one of the most rapidly growing cities in Southern California. The Company owns its own supply of gas-making materials, whereby larger profits are assured than can be made in any other locality in the United States. Address for particulars T. S. C. LOWE,

1176-tf Passadena, Cal.

**SUPERINTENDENT.**

An active man wants the management of a gas property. Would be willing to work under an older man in a city of over 30,000,000 output. A close manager, especially expert in the handling of Lowe water gas machinery. Member of the American Gas Light Association.

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in first-class condition.

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**FOR SALE.**

**Steel Plate Hydraulic Main,**

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**Hydraulic, Dip, Branch and Ascension Pipes, Mouthpieces and Lids,** for four Benches of 5's and for one Bench of 3 retorts.

**Two Coolers, or Air Condensers,** each of 150'000 cubic feet capacity.

**Multitubular Condenser,** shell, 36 in. diameter, with 98 2-in. tubes, 10 ft. 6 in. long.

**D-Shaped Tar Extractor,** 8 ft. long, 1 ft. 6 in. deep.

**Scrubber,** 48 in. diameter, 11 ft. 9 in. high. Three man holes, 11 in. by 15 in.

**S-inch Center Seal. Four Purifiers,** 8 ft. x 6 ft.

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NO EXTRA LABOR OR OPERATING EXPENSES.

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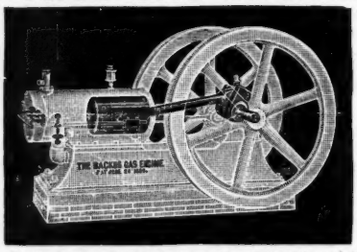
## MARQUAND & PARMLY,

160 Broadway, New York.

*Members New York Stock Exchange.*

## BACKUS GAS ENGINES



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Home Office, Backus Water Motor Co., Newark, N. J.

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BLOCKS, TILES, FIREBRICKS, FIRE CEMENT,

Stettin "Anchor" & "Eagle" Brand Portland Cement

10 & 12 Old Slip, New York.

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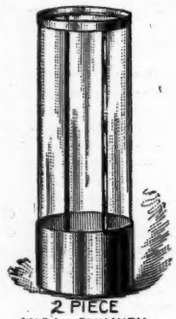

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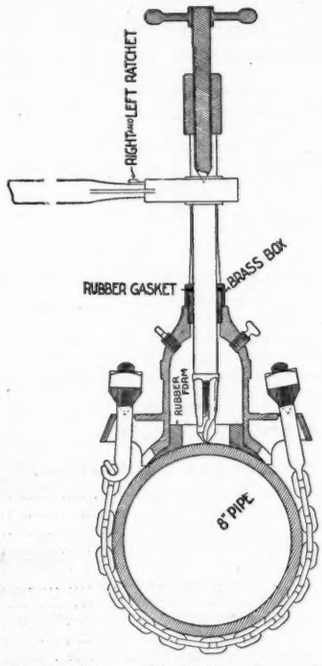


This Machine will drill and tap ¾-inch to 2 inch holes in 2-inch to 36-inch pipe, without any escape of gas. Shipped on 30 days' trial to any Gas Company. Manufactured by

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THE ANDERSON Patent Cutter Carrying Link

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Will cut from 2 in. to 24 in.

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For Cutting Cast, Wrought Iron, Gas & Water Pipes.

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WALDO BROS., 102 Milk Street, Boston, Mass.

WE respectfully solicit correspondence from every Gas Company interested in the sale of Gas Ranges, Hot Plates, etc., for the season of 1898. . . .

Our lines are complete, and we guarantee prompt service.

LET US FIGURE WITH YOU.

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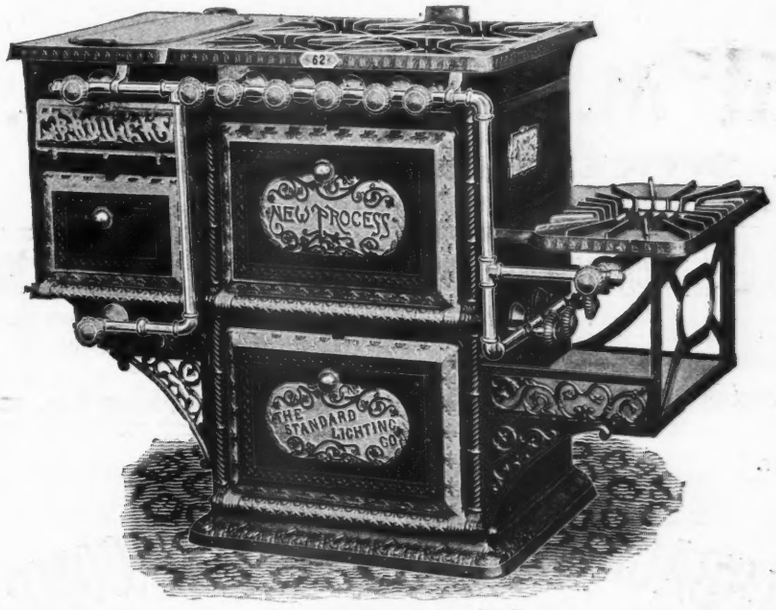
**HAVE AN EXCELLENT REPUTATION EVERYWHERE, WHICH IS FULLY SUSTAINED BY THEIR MERITS.**

GOOD "TALKING POINTS" ON GAS RANGES HELP TO SELL, BUT

# FACTS

ARE OF VITAL INTEREST TO GAS COMPANIES, WHO SECURE EITHER PERMANENT BENEFIT OR INJURY FROM EVERY GAS RANGE SOLD.




**It is a Fact** that the Reflex Oven of the **"New Process"** Gas Range is the only one that is right. It brings fresh, moist air in contact with the food in the oven, and bakes evenly through and through—doesn't simply dry up.

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**We have the Largest and Best Equipped Plant in the World** for the exclusive manufacture of this class of goods. We cordially invite the inspection of our works by representatives of Gas Companies, and solicit their co-operation (customers or not) in furthering our mutual interests. We are in the very "pink" of condition to serve our old customers, and solicit a trial order from those unacquainted with our line.

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Because we carry the largest assortment of goods pertaining to the use of gas in the World.

Our new Catalogue will be mailed to all the Gas Companies in the United States and Canada. Keep it on file for reference.

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Are the reliable sort that every Gas Company can recommend for general use. Every Burner is stamped with Name and Trade Mark, which is a guarantee of quality by the Largest Burner Factory in the World.

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——OWNS, CONTROLS AND OPERATES——

EXCLUSIVELY

STYLE No. 81.

## THE NEW IMPROVED AND PATENTED

# STREET LIGHT BURNER.

STYLE No. 97.

**Our PATENTED "STREET LIGHT APPLIANCES" have made WELSBACH STREET LIGHTING a complete success.**

**By the UNIFORM DISTRIBUTION of light on scientific principles a greater area can be lighted by our system and more economically than in any other way.**

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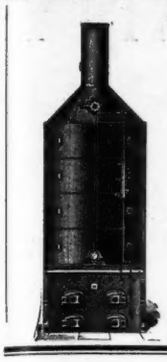
Lists of Cities and Towns in which we are now lighting under contract will be furnished upon application.

**CORRESPONDENCE SOLICITED FROM GAS COMPANIES AND OTHERS INTERESTED IN MUNICIPAL LIGHTING.**

# HIGH-PRESSURE WATER-TUBE BOILERS



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GREAT SAVING OF FUEL AND FLOOR SPACE.
A HIGH-CLASS BOILER WITH AN UNEQUALED RECORD.
Send for our New Book, "The Generation of Power."

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Designed and Built by us
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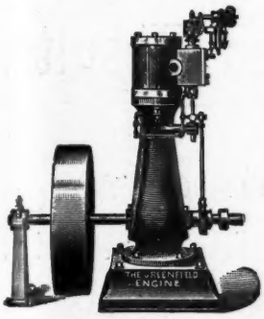

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MANUFACTURERS OF
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**ENGINES AND BOILERS.**
Also Horizontal, Automatic and Variable Cut-off Engines
Sizes from 3 to 75 Horse Power.
Also Vertical and Horizontal and Marine Boilers.
Steam Pumps and Adams' Crate Bars.
W. G. & G. GREENFIELD, - - EAST NEWARK, N. J

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**For Gas Purification.**

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Purifiers, Condensers, Scrubbers, Oil Tanks, Smoke Stacks.
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They control the pressure at the burner, and deliver the quantity for which they are set regardless of high or low pressure in the supply.
**WELSBACH LIGHTS** are fully controlled, and the governors soon pay for themselves by preventing the breaking of mantles and chimneys. Thousands are already in use. Orders may be given to the Welsbach Co., or sent to ourselves.
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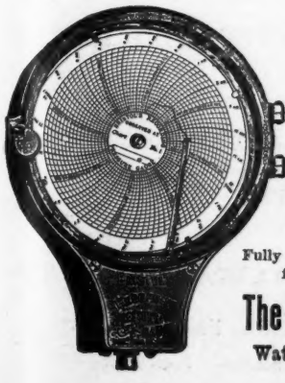

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For continuous records of **Street Gas Pressure**
Simple in Construction, Accurate in Operation Low in Price.
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Special Trays for Iron Sponge or Oxide of Iron.
**CHURCH'S TRAYS a Specialty.**
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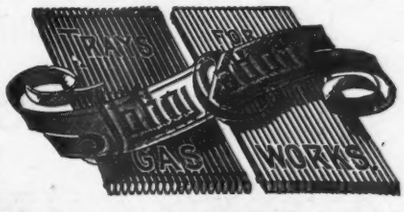


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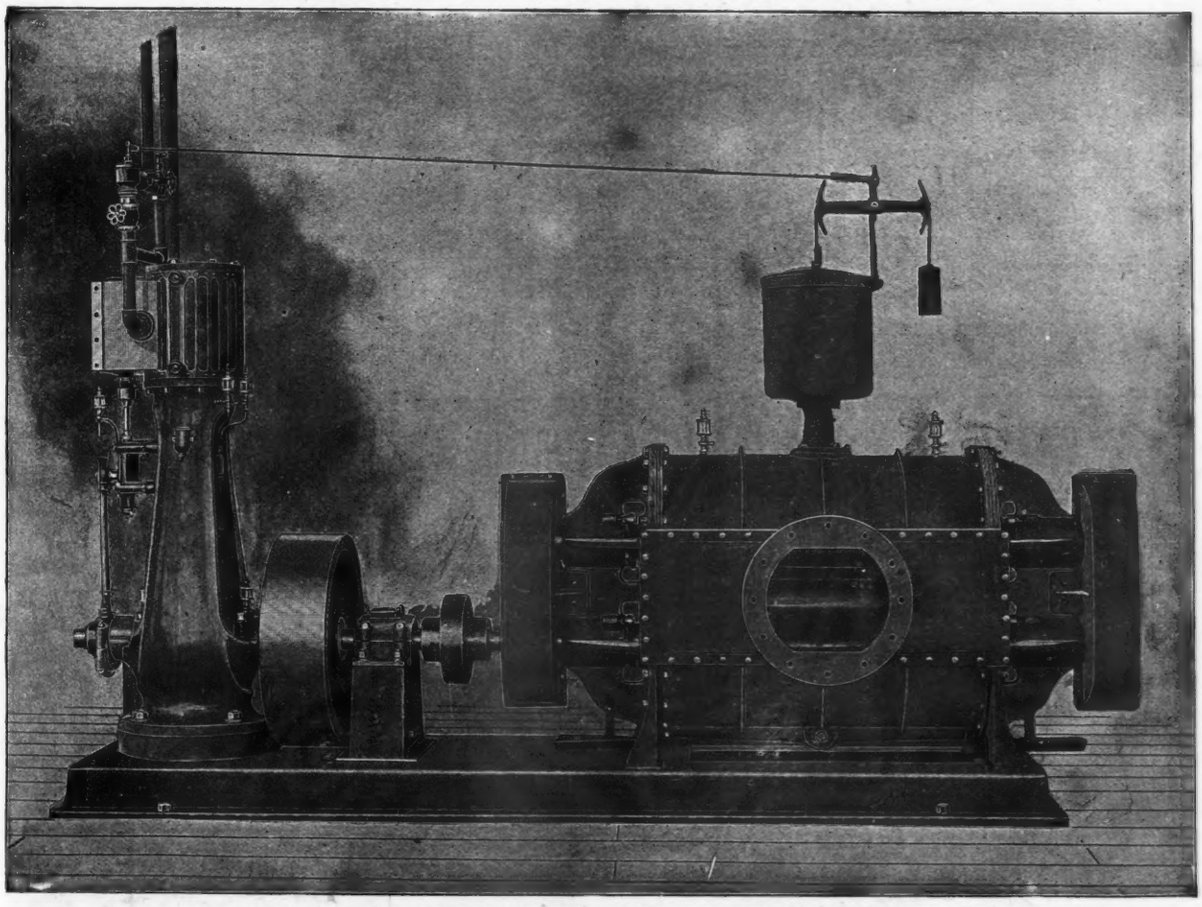

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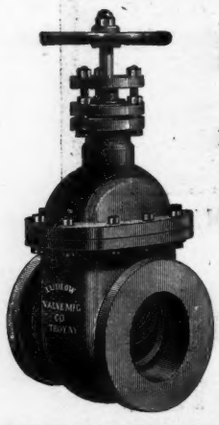

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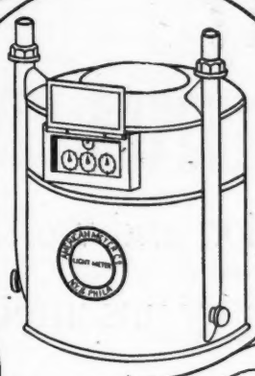

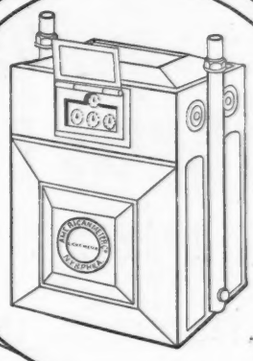

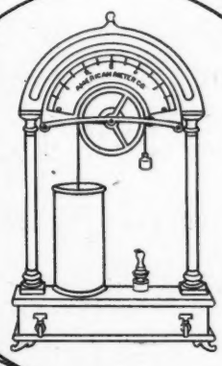

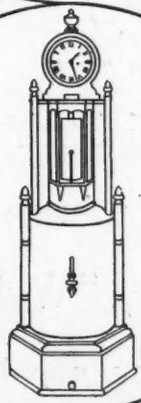

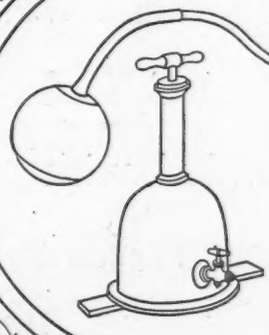

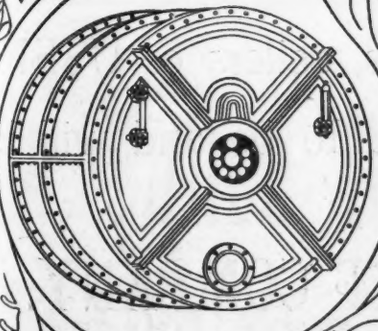

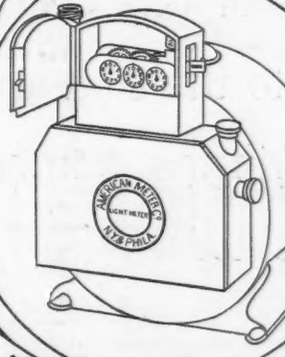

## PUBLIC LIGHTING TABLE.

### MARCH, 1898.

| Day of Week. | Date. | Table No. 1. FOLLOWING THE MOON. Light. | Extinguish. | Table No. 2. NEW YORK CITY. ALL NIGHT LIGHTING. Light. | Extinguish. |
|---|---|---|---|---|---|
| | | | | P.M. | A.M. |
| Tue. | 1 | 2.00 AM | 5.30 AM | 5.30 | 5.45 |
| Wed. | 2 | 2.40 | 5.30 | 5.30 | 5.45 |
| Thu. | 3 | 3.20 | 5.30 | 5.30 | 5.45 |
| Fri. | 4 | 3.50 | 5.30 | 5.30 | 5.45 |
| Sat. | 5 | 4.20 | 5.30 | 5.40 | 5.35 |
| Sun. | 6 | No L. | No L. | 5.40 | 5.35 |
| Mon. | 7 | No L. FM | No L. | 5.40 | 5.35 |
| Tue. | 8 | No L. | No L. | 5.40 | 5.35 |
| Wed. | 9 | 6.30 PM | 8.50 PM | 5.40 | 5.35 |
| Thu. | 10 | 6.30 | 10.00 | 5.40 | 5.35 |
| Fri. | 11 | 6.30 | 11.10 | 5.40 | 5.35 |
| Sat. | 12 | 6.30 | 12.20 AM | 5.50 | 5.20 |
| Sun. | 13 | 6.40 | 1.30 | 5.50 | 5.20 |
| Mon. | 14 | 6.40 LQ | 2.40 | 5.50 | 5.20 |
| Tue. | 15 | 6.40 | 3.30 | 5.50 | 5.20 |
| Wed. | 16 | 6.40 | 4.20 | 5.50 | 5.20 |
| Thu. | 17 | 6.40 | 5.00 | 5.50 | 5.20 |
| Fri. | 18 | 6.40 | 5.00 | 5.50 | 5.20 |
| Sat. | 19 | 6.40 | 5.00 | 6.00 | 5.10 |
| Sun. | 20 | 6.50 | 5.00 | 6.00 | 5.10 |
| Mon. | 21 | 6.50 NM | 5.00 | 6.00 | 5.10 |
| Tue. | 22 | 6.50 | 5.00 | 6.00 | 5.10 |
| Wed. | 23 | 6.50 | 5.00 | 6.00 | 5.10 |
| Thu. | 24 | 6.50 | 5.00 | 6.00 | 5.10 |
| Fri. | 25 | 6.50 | 5.00 | 6.00 | 5.10 |
| Sat. | 26 | 10.10 | 5.00 | 6.10 | 4.55 |
| Sun. | 27 | 11.00 | 4.50 | 6.10 | 4.55 |
| Mon. | 28 | 11.50 | 4.50 | 6.10 | 4.55 |
| Tue. | 29 | 12.40 AM FQ | 4.50 | 6.10 | 4.55 |
| Wed. | 30 | 1.20 | 4.50 | 6.10 | 4.55 |
| Thu. | 31 | 1.50 | 4.50 | 6.10 | 4.55 |

## TOTAL HOURS LIGHTING DURING 1898.

| By Table No. 1. | Hrs. Min. | By Table No. 2. | Hrs. Min. |
|---|---|---|---|
| January | 210.40 | January | 423.20 |
| February | 186.40 | February | 355.25 |
| March | 181.20 | March | 355.35 |
| April | 166.10 | April | 298.50 |
| May | 156.40 | May | 264.50 |
| June | 144.30 | June | 234.25 |
| July | 147.30 | July | 243.45 |
| August | 157.10 | August | 280.25 |
| September | 169.50 | September | 321.15 |
| October | 186.00 | October | 374.30 |
| November | 204.30 | November | 401.40 |
| December | 218.30 | December | 433.45 |
| Total, yr. | 2129.30 | Total, yr. | 3987.45 |

# $500.00 Reward!

THE PUBLIC IS CAUTIONED that imitation and worthless incandescent burners and mantles are being sold by unscrupulous dealers on the representation that they are the genuine "Welsbach."

THE WELSBACH LIGHT COMPANY will pay $500.00 reward for the arrest and conviction of any person representing and selling incandescent burners or mantles as genuine "Welsbachs" that do not bear our trade-mark.

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WELSBACH LIGHT COMPANY.

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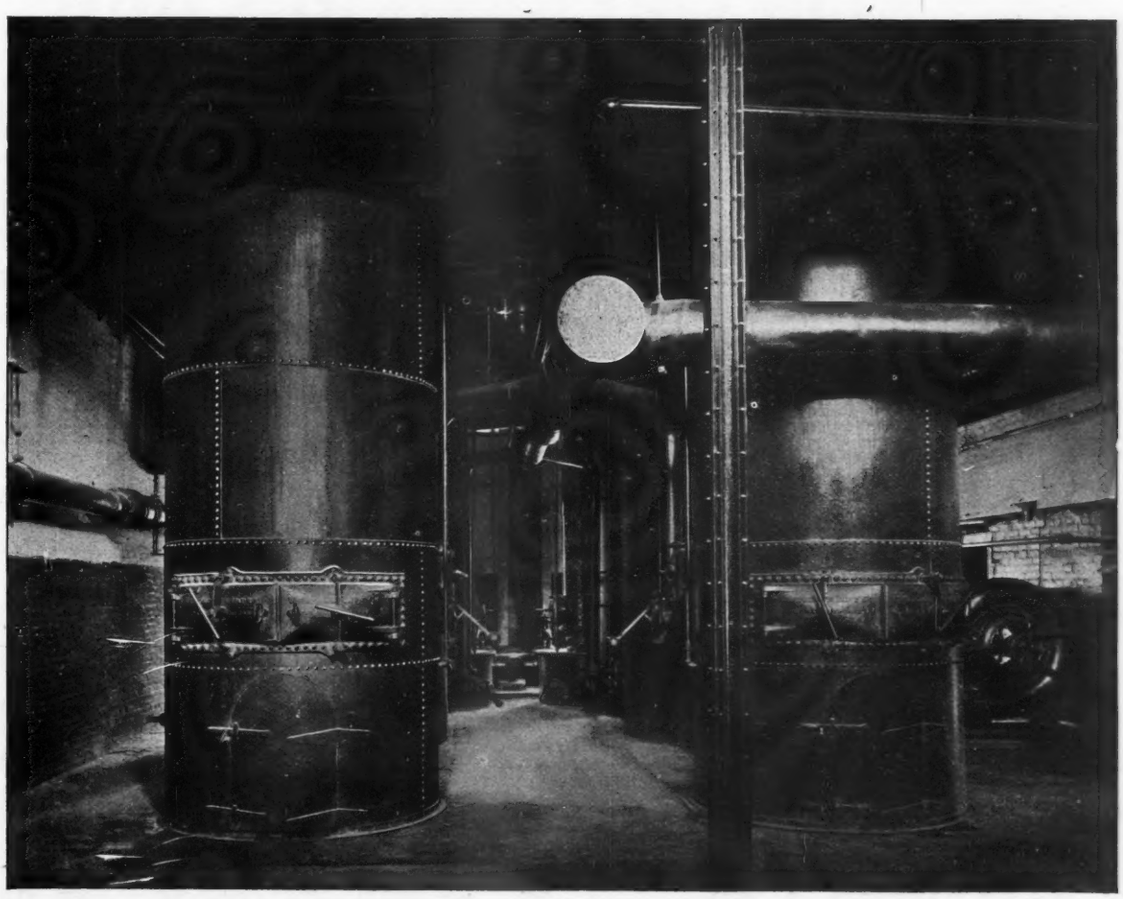
# DOUBLE-SUPERHEATER LOWE WATER GAS APPARATUS.

**Number of Installations to Date, - - 244**

**Total Daily Capacity, 131,825,000 Cu. Ft.**



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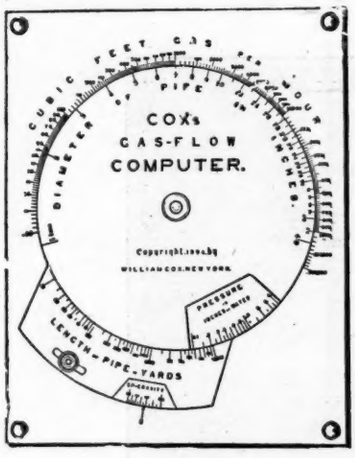


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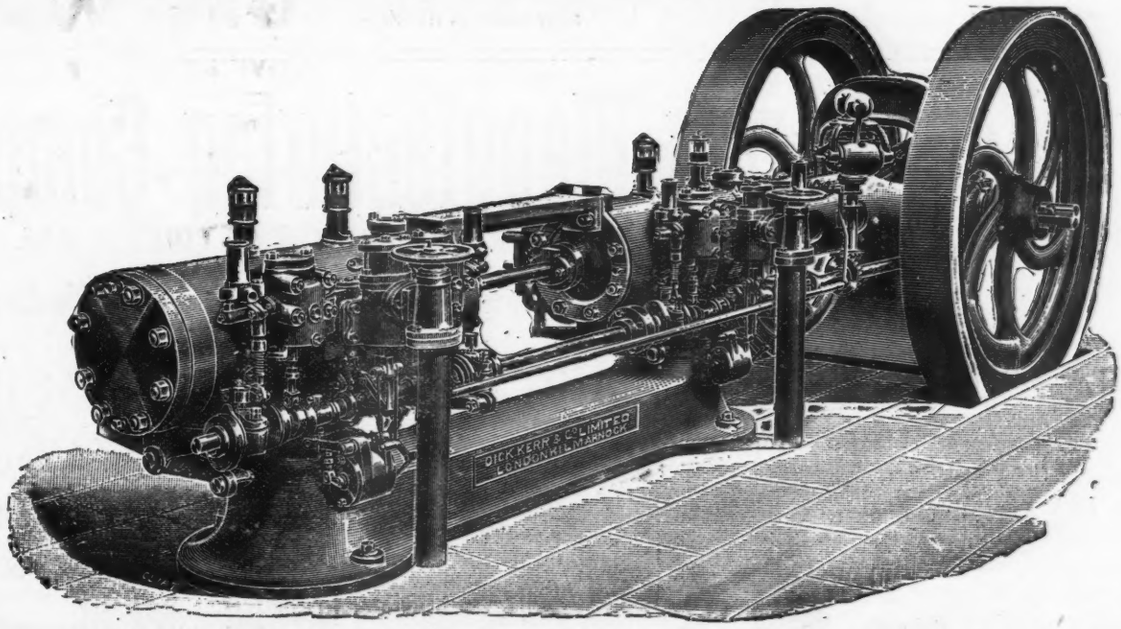


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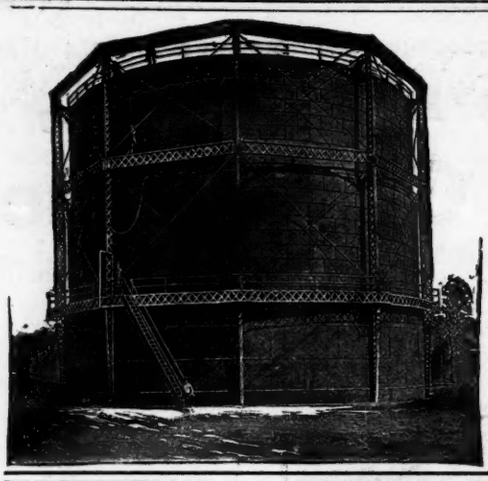

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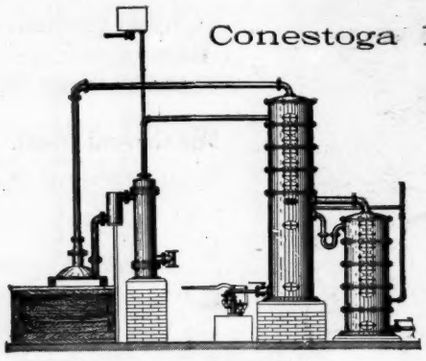

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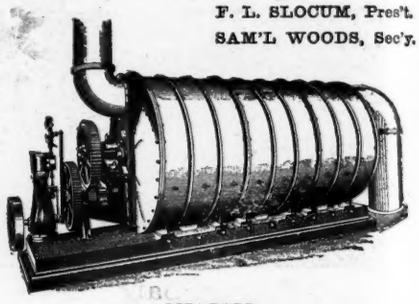

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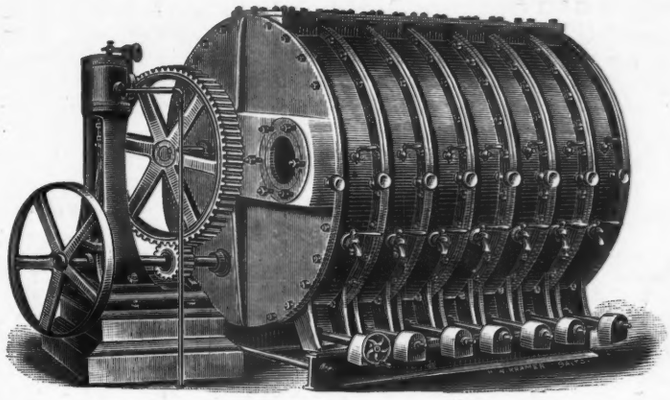

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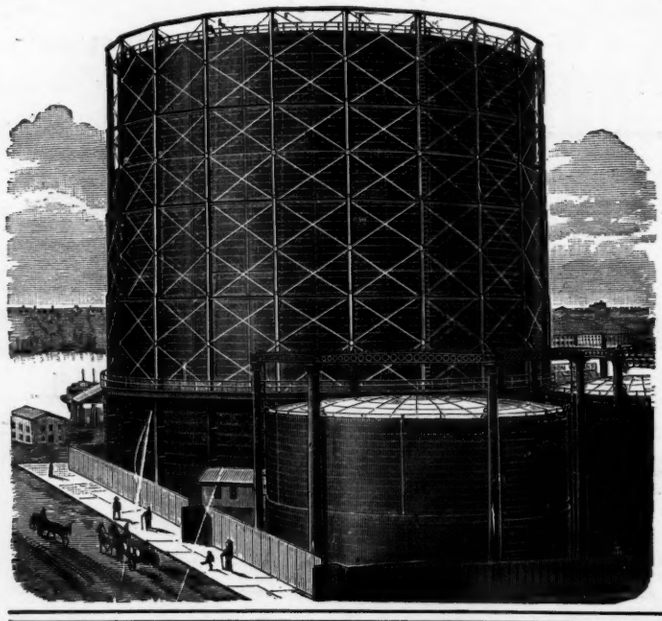

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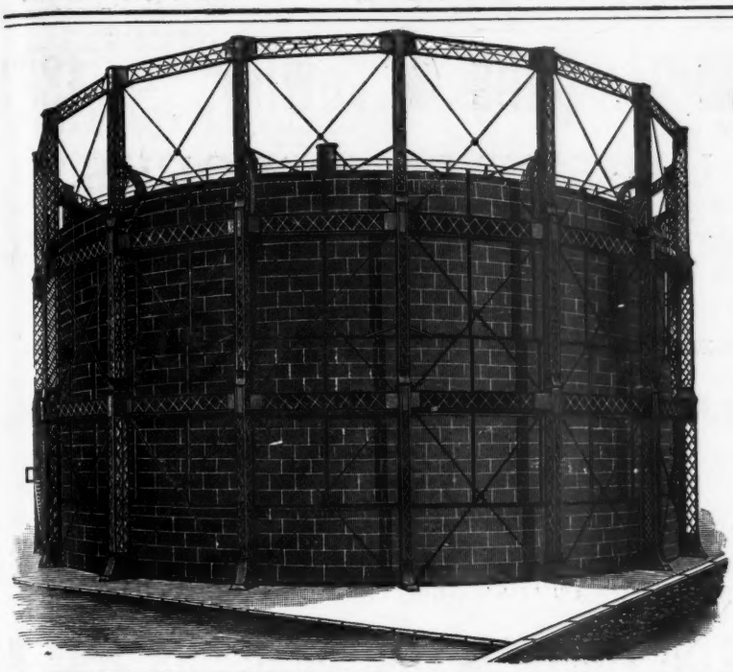

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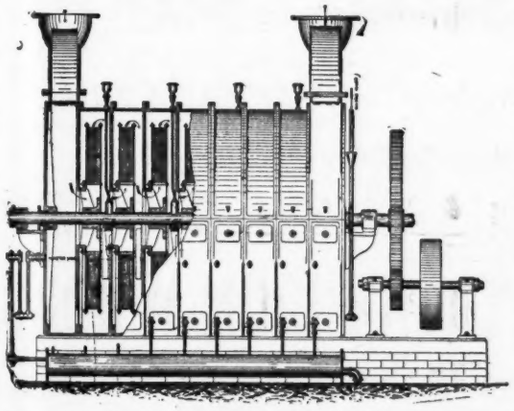

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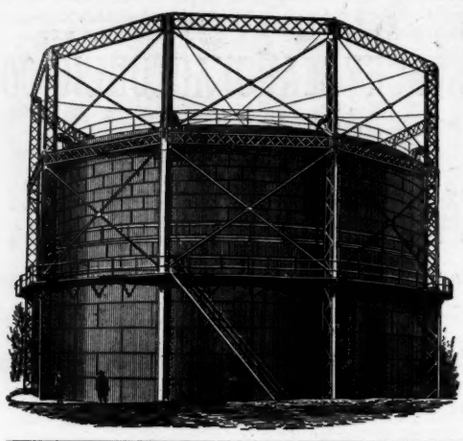

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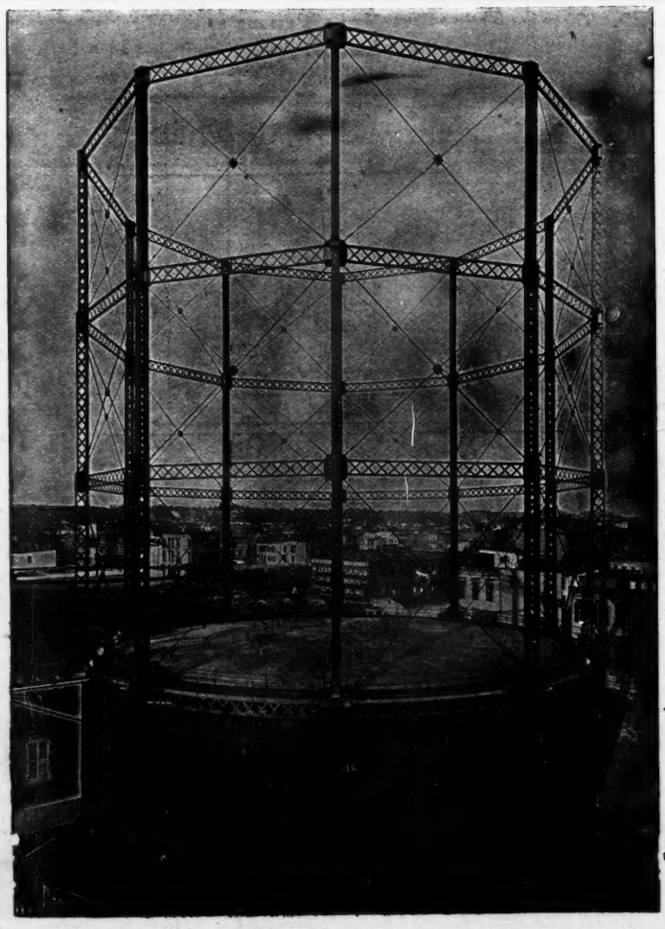

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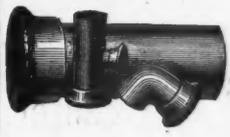

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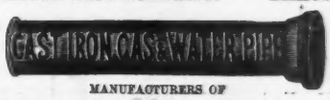


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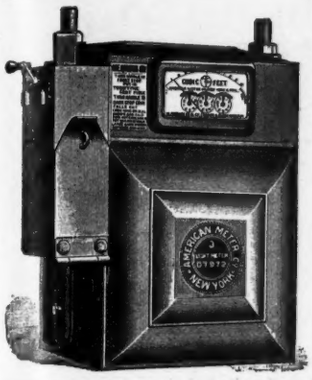

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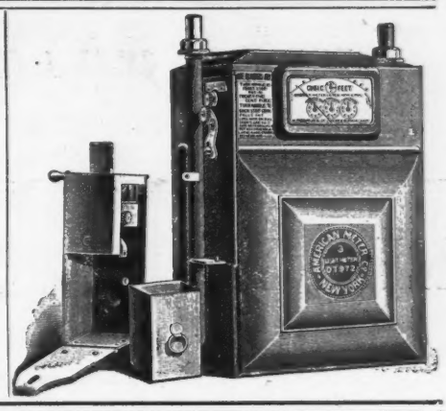

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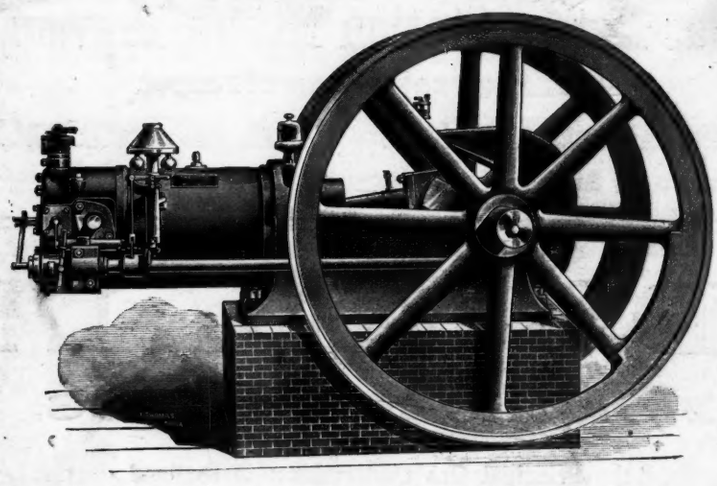
Over 60,000 in Use.



The United Gas Improvement Company, by the lease of the Philadelphia Gas Works, derives a yearly revenue estimated at **$250,000 to $275,000** from the sale of gas consumed by OTTO GAS ENGINES exclusively in the city of Philadelphia, there being over 700 engines in use, ranging from 1 to 50 H.P.

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